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AIR TRANSPORT PROGRESS ISSUE

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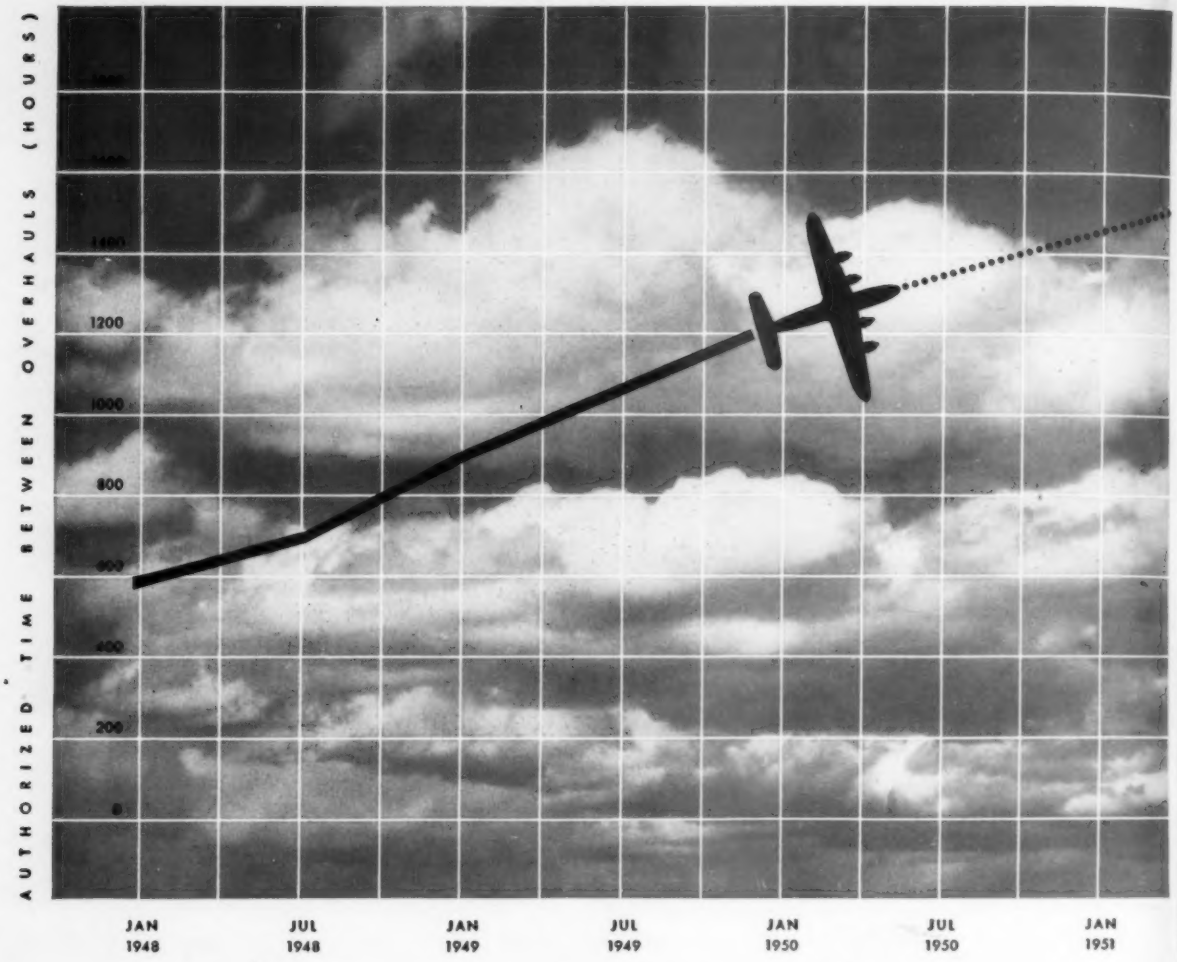

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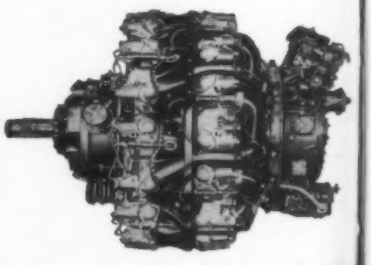

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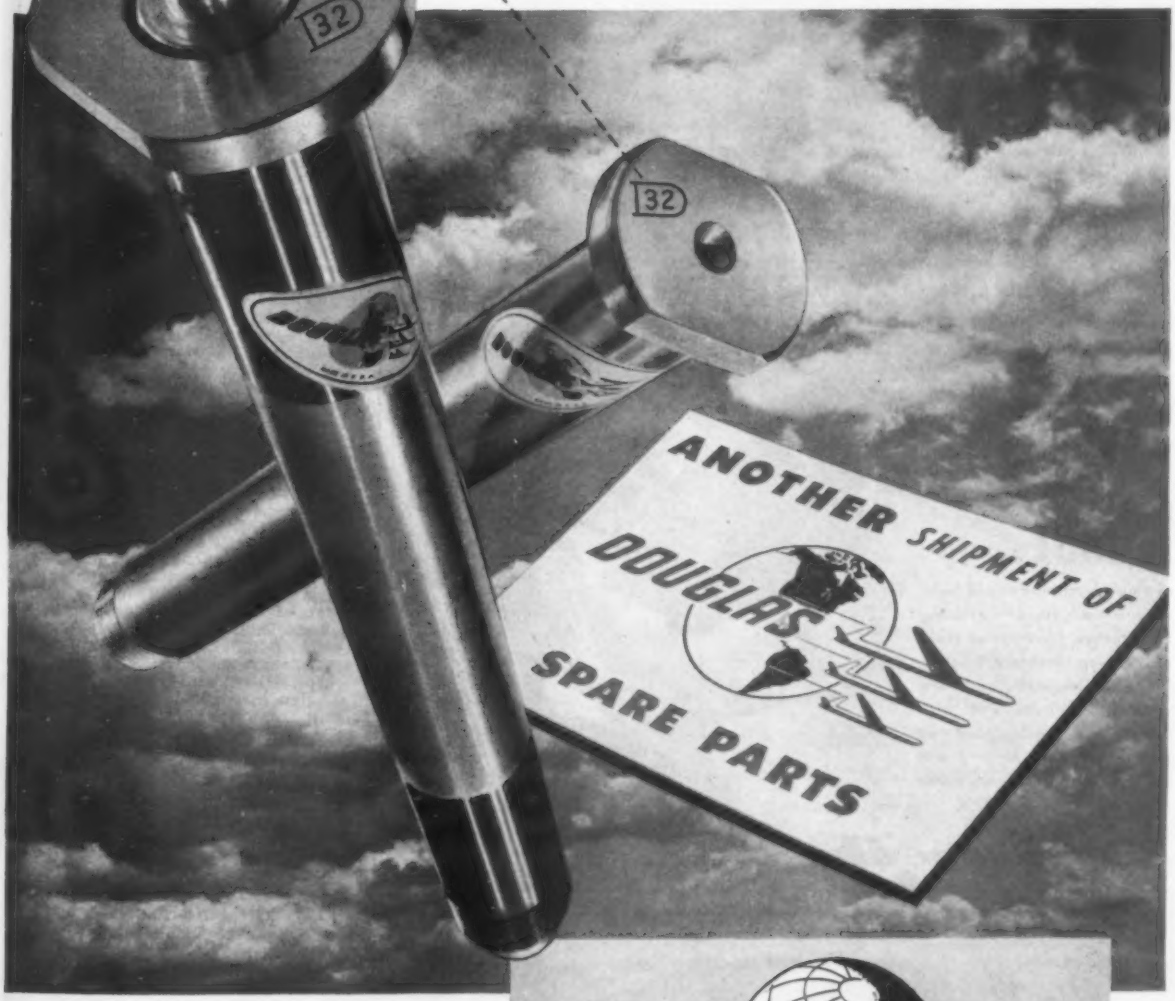

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Aviation Calendar

April 16-20—American Association of Airport Executives annual meeting, Neil House Hotel, Columbus, Ohio.

April 17-19—SAE aeronautic meeting and aircraft engineering display, Hotel Statler, New York City.

April 22—Personal aircraft operation and maintenance conference, Municipal Airport, Reading, Pennsylvania.

April 24-26—Airport Operators Council third annual meeting, Hotel Carter, Cleveland, Ohio.

May 5-6—National Intercollegiate Air Meet, Stephens College, Columbia, Mo.

May 18-19—Corporation Aircraft Owners Association annual meeting and Third National Forum, Hotel Statler, Washington, D. C.

May 19-20—Institute of the Aeronautical Sciences 7th annual Personal Aircraft meeting, Lassen Hotel, Wichita, Kansas.

May 20-21—National Air Carnival, Birmingham, Alabama.

May 22-23—Third annual Air Transportation conference, Purdue University School of Aeronautics, Lafayette, Indiana.

June 1-3—Aviation Writers Association convention, Montreal, Quebec.

June 2-11—7th annual Michigan Aviation Week (sponsored by Aero Club of Mich.).

June 4-9—SAE summer meeting, French Lick Springs Hotel, French Lick, Indiana.

June 10-13—National Aeronautic Association 28th annual convention, Hotel Statler, St. Louis, Missouri.

June 21-25—Ninety-Nines convention, Ft. Clark Guest Ranch, Branchettsville, Texas.

June 22-23—Aviation Distributors and Manufacturers Association midyear meeting, Edgewater Beach Hotel, Chicago, Illinois.

June 26-30—American Society for Testing Materials annual meeting and exhibit of testing apparatus and equipment, Atlantic City, New Jersey.

July 12-14—Institute of the Aeronautical Sciences annual summer meeting, IAS Western Headquarters Bldg., Los Angeles, California.

July 14-16—National Pilots Air Meet and Races, Chattanooga Municipal Airport, Chattanooga, Tennessee.

July 25-30—Academy of Model Aeronautics national model airplane championship contest, Naval Air Station, Dallas, Texas.

Sept. 4-6—National Flying Farmers Association annual convention, Bemidji, Minn.

Sept. 18-22—Instrument Society of America 5th annual Instrument Conference and Exhibit, Memorial Auditorium, Buffalo, New York.

Sept. 28-30—Air Reserve Association annual convention, Hotel Texas, Ft. Worth, Texas.

Oct. 2-4—National Association of State Aviation Officials annual convention, Minneapolis, Minnesota.

International

May 9—IATA Composite traffic conferences 1-2-3, Madrid, Spain.

May 9—IATA Fourth technical conference, United States.

May 30—ICAO Fourth Assembly, Montreal, Quebec.

May 30—ICAO Legal Committee meeting, Montreal, Quebec.

Sept. 5-10—Society of British Aircraft Constructors, annual flying display and exhibition, Farnborough, England.

Oct. 16-20—IATA Annual general meeting, Fairmont Hotel, San Francisco, California.

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Air Transport PROGRESS

BY ANY and all standards of measurement in this half-century year of 1950, man's conquest of the skies has moved forward at a spectacular pace.

In this special issue of air transport progress the staff of AMERICAN AVIATION has endeavored to illustrate in photographs and statistics, and to exploit in words, the dramatic growth of an industry which has quickened the travel habits of millions of people and has speeded up the movement of mails and goods to all parts of the globe.

We are privileged to supplement this story of dynamic growth by the publication of the new annual edition of the Air Transport Association's authentic *Air Transport Facts and Figures.*

Fostered a quarter of a century ago by the Post Office Department, the domestic airlines of the United States have more than justified the faith and investment of their sponsors. In 1949 revenues from carrying the mail represented only 10.08% of total revenue, a tribute in itself to private enterprise and initiative in weaning itself from government aid.

In a multitude of ways the airlines have demonstrated impressive advances. The 5,590 employes of 1940 have increased to 78,000 ten years later. The 2,802,000 passengers of 1940 increased to 13,781,000 last year. In a decade the domestic revenue passenger miles jumped from one billion to six and a half billion.

The year 1949 was in itself distinguished by new records. It was the safest year in history—73,000,000 passenger miles flown per passenger fatality. Of the 356,000 total route miles in the U. S. airline system, 210,000 were international. Gross revenues had increased 13% over the year before and a net operating profit of $44,000,000 was estimated.

If any one milepost were needed to illustrate the historic fact that the airlines had come of age as an important industry, the total operating revenue for domestic, local service and international carriers would suffice. The figure for 1949 reached $766,000,000.

Inspiring as the record is at this half-century mark, much is yet to be unfolded in the decades to come. New power, new speeds, new ranges, greater lift capacity, and an increasing acceptance of air transportation throughout the world, give assurance of continuing progress. The dreams of an air age are being fulfilled with tangible achievements in the year-to-year record. Those who have pioneered in the building to date can well be proud of their accomplishments.

Under any standard of measurement, the record in this year of 1950 is good.

Wayne W. Parrish

EDITOR AND PUBLISHER

Now DC-4 operators, too, can cut brake maintenance costs

THE AIRLINES that have switched their DC-3s to B. F. Goodrich brakes have made important reductions in maintenance costs. TWA reports substantial savings on its Stratoliner brake maintenance after making the switch. Now DC-4 operators can do the same!

The CAA has approved B. F. Goodrich brakes for the DC-4, following extensive tests by Capital Airlines.

Simple design is the reason behind the low upkeep of B. F. Goodrich Expander Tube brakes. Many of the extra parts and linkages found in other brakes are eliminated. A screwdriver and wrench are the only tools needed for relining. Full-circle braking action and low-pressure operation make for slower, more even wear. New, cemented brake blocks that use no rivets permit use of *all* the lining. As a result, maintenance man-hours, flying-time losses and replacement costs are all cut!

What's more, pilots report they like the "operational feel". This brake cannot lock or grab. It responds smoothly to minimum pressure. It takes emergency overloads better.

The B. F. Goodrich brake also saves weight. It can be designed lighter for a given amount of kinetic energy than any other brake.

Here are a few of the planes that are reaping these benefits of the BFG wheel and brake assembly: Stratocruiser, B-36, Constitution, B-47, Navion, C-124, B-45, P2V4, F-84, converted DC-3s, converted Stratoliners. Put your DC-4s in this good company. *The B. F. Goodrich Company, Aeronautical Div., Akron, O.*

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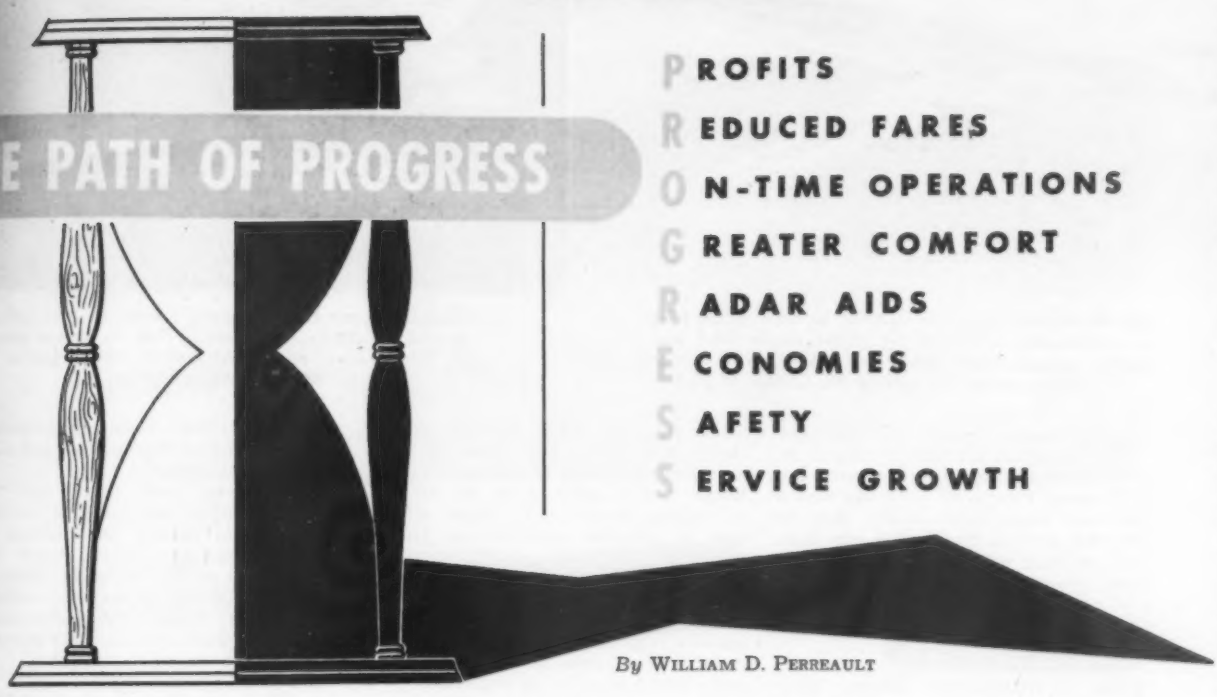

THE PATH OF PROGRESS

PROFITS
REDUCED FARES
ON-TIME OPERATIONS
GREATER COMFORT
RADAR AIDS
ECONOMIES
SAFETY
SERVICE GROWTH

By WILLIAM D. PERREAULT

DURING 1949 the greatest air show of all time took place. It was not a static show, an idle display of potential, nor was it confined to the area of an exhibition ground, a state or even the United States.

The show was the day in and day out operation of the U. S. air transport system. The place was the world. The show people were the men and women of the airlines, the military transport services, various civil government agencies, the manufacturers, and related associations.

As a prewar peacetime industry, U. S. aviation ranked 44th, between the sausage and candy industries. By the end of 1949, despite crippling over-expansion in the immediate postwar period, a shortage of modern flight equipment and a severe overdose of competition, the industry had moved into world prominence.

The year-end saw the capital assets of the airline industry at well over $720,000,000. Employment in this phase of the industry had exceeded the 78,000 mark in 1949. There were 163,145 people working in major aircraft manufacturing plants supplying craft for all types of military and civil operations, 39,961 more in engine manufacturing plants.

But transport progress can not be gaged by capital investment alone. In a land where competition reigns, there are two yardsticks for air transport progress:

(1) the type of service provided;

(2) the economic soundness of the service.

Perhaps this is where the U. S. transport industry showed up best.

Year-end figures show that the total net operating profit of the U. S. scheduled domestic trunklines during 1949 was $24,000,000. The profit is startling when one considers that in 1947 the domestic airlines had a gross deficit of $20 million and in 1948, a

Boeing Stratocruiser—Fifty-five of these double-decked luxury transports have been placed in airline service. Four U. S. users are Pan American, 20; American Overseas, 10; United, 8; Northwest, 10. British Overseas Airways also operates the craft.

Martin 4-0-4—Newest transport to be ordered, the 4-0-4 is a pressurized version of the earlier Martin 2-0-2 with greater payload, higher speed and better service. Trans World Airline has ordered 30, Eastern 35.

Douglas Super DC-3—Capital Airlines has ordered three Super DC-3's, introduced in 1949, to replace existing DC-3's. Douglas designed the craft to provide greater capacity, speed and utility.

small operating profit of $2,075,000.

The transport services of the U. S. were initially developed to carry the U. S. mail. Passenger carrying was a late and unheralded event. But in 1949 the airlines found that less than 11% of their total revenues was derived from mail payments.

MORE SERVICE

THE SCHEDULED airlines provided direct service into 592 towns and cities in the U. S. last year as compared to 541 in 1948. Many of these points were large cities but for every key populated center served, there were numerous stops which did not carry their own weight. The airlines had taken on all the aspects of a public utility. Social considerations were often given more weight than economic factors.

Air travelers could buy an airline ticket to almost any place in the world at over 3,600 places in the U. S. Some ticket sales were at airport terminals, others in city ticket offices and a sizeable number in travel agencies. No sales organization is more efficient than its distributor channels. The airlines had gradually arrived at a distributor network that proved reasonably efficient and productive, but even so new channels were constantly being explored.

At one period during 1949 there were 110 round trips weekly connecting the U. S. and points overseas. The picture was the same on the home front. The passenger desiring connections between key cities found the service more than adequate. (See page 58). In the peak season there were 60 connections per day between New York and Washington, 26 trips connecting New York and Miami, 48 connecting New York and Boston, and similar frequencies between other large centers.

The service was there and the traveling public recognized it. For the first time in history the number of airline passenger miles flown exceeded 40% of the railroad Pullman service. In 1949 the domestic airlines of the U. S. carried 15,291,026 revenue passengers some 6,815,658,000 revenue passenger miles.

On the international front U. S. scheduled operators carried 1,526,844 revenue passengers 2,072,749,000 passenger miles. In addition some 45 non-scheduled air carriers operating under the U. S. flag at home and overseas provided 257,083 passengers with 456,314,086 passenger miles of service. While this sum represented only 5% of the scheduled airline traffic, it was nonetheless a sizeable amount of business.

Lockheed Constellation—There have been three principal models of the famous "Connie"—the 049, 649 and 749. There are 76 Constellations in scheduled airline service: EAL, 20; TWA, 35; AOA, 7, and PAA, 14. Total planes delivered or now on order is 213. Principal U. S. orders outstanding are 20 for TWA, 5 for Chicago and Southern, and 5 for Capital.

Douglas DC-6A—This all-cargo version of the DC-6 was introduced in 1949. It features a fuselage five feet longer than the DC-6, new P&W R-2800-17 engines with improved performance, a built-in cargo hoist and other features which make it the first commercially available transport for this purpose. No orders for the DC-6A have been announced to date.

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Martin 2-0-2—Of the 30 Martin 2-0-2's manufactured for the airlines, 25 went into service with Northwest Airlines and the remainder with a foreign operator. Twelve additional, now being completed, will be leased to TWA prior to delivery of Martin 4-0-4's on order.

Convair Liner—Of 174 Convair Liners built, 113 are in commercial airline service in the U. S., 4 additional are scheduled to go in service with Mid-Continent soon. Convair Liners are in service with: American Airlines, 73; Pan American, 20; Western, 10; Continental, 5; Northeast, 5.

SAFETY

ONE OF THE points which the passengers recognized was the ever improving safety record of the scheduled airlines. In 1949 the airlines of the U. S. set a record of 1.0 passenger fatalities per 100 million passenger miles flown. The international operators had a perfect record with no passenger fatalities during 1949, while the domestic operators had a record of 1.3 fatalities per 100 million passenge miles, a record matched in only two previous years, 1939 and 1946.

In 1949 Colonial Airlines started its 20th year of operation without fatality. During this 19-year period Colonial had flown over 20,000,000 plane miles, completing 250,545,622 passenger miles without a single fatal accident or even a serious one. It was an important landmark in aviation safety. Yet it is interesting to note that in 1949 alone United Air Lines, flew 52,650,126 plane miles and 1,-275,218,000 passenger miles, without a fatality.

Colonial's record stands as an important milestone, since much of the record was established during times when flying wasn't as safe as it is today. Equipment was of marginal design, the airways virtually non-existent, and the science of flying around the clock and year-round on reasonable schedule was largely undeveloped.

CARGO

THE GROWTH of air cargo as an important factor in airline operations was impressive during 1949. The domestic airlines carried a record 124,410,482 ton miles of freight and express during the year. Domestic air freight alone was up 34% over the previous year, exclusive of the 435,-993 ton miles generated by feeder airlines. International cargo operations accounted for 57,343,695 ton miles of freight and express during the year. CAA figures indicate the irregular air carriers accounted for about 6% as much cargo volume as the domestic airlines.

There were important developments in the cargo field during the year. Prime among these was the certification of four all-cargo carriers (see page 85). The carriers certificated for this new and important role in the scheduled airline pattern were The Flying Tigers, Slick Airways, U. S. Airlines, and Airnews.

No less important was the increasing attention being given the cargo handling business by the airlines. Some 100 cargo and combination cargo and passenger airplanes were in airline service at year-end.

Time and money, plus key personnel, were being dedicated to speeding up the ground handling of air cargo. One study showed that on shipments of 250 miles, 50% of the en route time was in ground handling, on 500 mile routes 33%, and even on 1,000 mile trips 20% of the time represented ground handling time. These are fields where solutions can be more effective than major increases in cruising air speeds.

The CAB ruling which authorized use of single-engine airplanes on feeder airline routes was also a milestone. As a result of this ruling three lines started operations which would otherwise have been economically unsound. These were Central Airlines, Mid-West Airlines, and Purdue Aeronautics.

The low operating cost of the Beech Bonanza (see page 75) used by Central and the Cessna 190's and 195's used by the other two operators extended scheduled airline service into many towns which could not hope to receive service with multi-engine equipment.

During 1949 Los Angeles Airways added to its already fine record as the first certificated helicopter operator doing an important and outstanding job in the carriage of mail in and around Los Angeles. The year also marked the introduction of the second helicopter air mail route, Helicopter Air Service in the Chicago area.

The helicopters in these two operations are building a record on which future passenger carrying service by helicopters will be based (see page 68. There is little doubt that this service will be introduced and already the manufacturers are offering a number of transport helicopter designs which could serve this purpose. (See page 67).

AIR COACH

DURING 1948 the airlines had experimented with higher fares as a means of overcoming the heavy financial losses experienced the previous year. While the quality of service had been improved during this period, by the introduction of improved postwar equipment (principally the Douglas DC-6, Lockheed Constellation, Convair Liner and Martin 2-0-2) passengers were not generally prepared nor willing to pay a premium for the service.

There was feeling that the airlines were pricing themselves out of the market. By 1949 the airlines had found that lower fares were necessary in order to penetrate an expanding market.

Thus last year virtually marked the end of special fare services for flights

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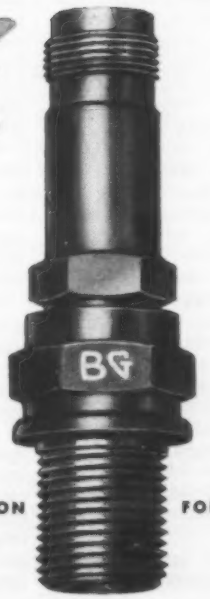

FOR AIRCRAFT ENGINES . . . AIRCRAFT SPARK PLUGS

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Douglas DC-6—The DC-6 is in service with six scheduled U. S. airlines. Of 161 built or on order, year-end records show 110 to be in use as follows: American, 49; Braniff, 6; Delta, 6; National, 4; Pan American, 6; United, 39. United, National, Delta and Panagra have all placed re-orders for DC-6's.

Douglas DC-6B—While no DC-6B's have been delivered as yet, both American and United have placed orders for a total of 11 to supplement existing DC-6 fleets. The DC-6B is a passenger version of the DC-6A Liftmaster. Its additional five feet of fuselage is being used either for extra seats or additional cargo space.

in improved equipment and the fare situation became a race toward lower prices. The 6c, plus, fare per passenger mile of 1948 was swiftly cut to a 4-5c fare and before the year was out fares in general were lower and the air coach services were well entrenched.

The air coach services had been introduced as a means of providing a bargain rate for fast air travel with fewer of the regular airline extras—no meals, no reservations, limited cabin service, etc. Low fares were balanced to some degree by provision of high density aircraft, aircraft with from 25-50% more seats than regularly used.

The air coach caught on, and by the end of 1949 there was a network of air coach services provided by the scheduled airlines that spanned the country in all directions at fares competitive with railroad coaches. And the airlines were making money.

Even the nature of coach service underwent change. The Douglas DC-4's were scheduled to be replaced by faster Lockheed Constellations and Douglas DC-6's. Flying at off schedule hours and thus raising the aircraft utilization, and attracting a new traffic potential which raised load factors, the coach service appeared to be here to stay.

In the early postwar years the scheduled airlines had fought hard against the non-scheduled carriers, operating with government surplus equipment and with safety standards well below the CAA enforced airline standards. But the same operating practice of these irregular carriers that harassed the established lines drove them to competitive steps which had a direct bearing on their 1949 profits.

While the irregular operators indirectly brought about some desirable changes by the scheduled airline operators, some of their marginal operating practices caused CAB and CAA to clamp down on the less responsible operators. Consequently 1949 saw a sharp reduction in the number of irregular airline operations and simultaneously an improvement in the standards of those remaining. Of 144 irregulars holding letters of registration in January 1949, only 91 held this status at year's end. Only 61 of these are actually operating and only 45 (see page 83) had any appreciable volume of business.

PASSENGER COMFORT

THE AIRLINES had introduced new standards of comfort in the postwar years. The change was as gradual as the introduction of new airplanes and people continued to cite the need for greater comfort without stopping to note what had happened. But the traveling public did recognize some changes.

There were private compartments, indirect lighting, improved air conditioning, sleeperette chairs and luxurious lounges, effective cabin pressurization and better food. And there were hard drinks being served, even on domestic flights.

When pressurized aircraft were placed in widespread use immediately after the war it often resulted in more aggravation than comfort. Equipment problems caused the pressurization systems to be inoperative a goodly part of the time. When operative they were generally controlled manually with pressure changes being generated even in level flight. Out of the confusion came improved equipment which in 1949 proved a useful contribution to passenger comfort.

Whether it was the relative roominess and larger windows of the Convair Liners and Martin 2-0-2's, the circular lounge in the aft cabin of the Douglas DC-6's, the eight-passenger private compartment of the Lockheed Constellations, or the lower deck lounge of the Boeing Stratocruiser—comfort was on the increase.

Speed in itself is not comfort. But marginal comfort is always aggravated by its duration. Prewar equipment is slow by postwar standards. The introduction of postwar fleets on many of the important traffic producing routes was consequently an important factor in increasing passenger comfort.

The complaints relating to lack of passenger comfort offered by air travel extend into the airport terminal with as much or more emphasis as to the airplane itself. One of the more encouraging developments in the improving airport situation was the attention being given to terminal design. During the year there were many functional terminal designs (see page 93) offering the passenger and potential passenger fine surroundings in which to make airline connections or pass time while awaiting incoming airplanes.

NEW EQUIPMENT

NEW EQUIPMENT had important impact on airline operations in 1949. It was in April that American Airlines became the first airline to be completely equipped with a post war passenger fleet. This fleet numbered 50 Douglas DC-6's and 75 twin engine Convair Liners. The step-type door of the Convair and the Martin 2-0-2, as introduced on Northwest Airlines routes, set off a chain of reactions.

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Veterans of the Airways

DURING 1949 a number of veteran transports continued to fly the airways, performing a sizable bulk of all scheduled air transport. Here is a cross-section of the more outstanding airplanes in this group, but it by no means represents all those in this category. Queen of these transports, the Douglas DC-3, was once heading for retirement from scheduled passenger carrying operations through adoption of new transport category requirements by CAB. But the Douglas veteran is expected to serve for many years to come.

Douglas DC-3—At year's end there were approximately 453 Douglas DC-3's in service with the scheduled airlines. Too numerous for mention here, the airlines using the DC-3 are listed on page 60.

Boeing Stratoliner—The Stratoliner was the first four-engine equipment introduced into airline service prior to the war. Five of these, in use by TWA, served as coach airplanes in 1949. They are scheduled for replacement in 1950.

Curtiss C-46— Thirty-eight Curtiss Commandos are now in use in cargo operations by scheduled airlines, including 18 with Slick Airways, 10 with Pan American, 5 each with the Flying Tiger Line, and U. S. Airlines.

Cessna T-50— The Cessna T-50 is now used by Wiggins Airways in feeder airline operation. Wiggins is operating 4 T-50's, providing service into small airports throughout New England.

Douglas DC-4—There were approximately 240 Douglas Skymasters in U. S. airline use during 1949. Included in this number were both military conversions and post-war DC-4's. A listing of these planes is shown on page 60.

Lockheed 18— Eleven Lockheed Lodestars are in service with National Airlines as that line's only twin-engine equipment. There are another 6 Lockheed 10A's in use by Wisconsin Central Airlines.

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Sperry's new simplified gyroscopic indicator—the ZERO READER*—is a *fast thinking calculator*. It continuously pieces together attitude, altitude, heading and radio path information and relieves the pilot of complex mental calculations on approaches and landings...simplifies en route flying procedures, leaving more time to devote to other problems vital to the success of his flight plan.

Sperry introduced the Gyro-Horizon, Directional Gyro, Gyrosyn Compass and Gyropilot. Now Sperry introduces the ZERO READER which is the only manual system approaching the performance of stabilized automatic flight control, another progressive step toward the development of all-weather operations.

Developed by Sperry with the cooperation and encouragement of All-Weather Flying Division, USAF and the Air Transport Association, the ZERO READER is an example of Sperry's never-ending search for new and better ways to improve flying techniques.

*TRADEMARK—PAT. PENDING

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Beech Bonanza—With the authorization of single-engine airplanes for use in scheduled passenger air-carrying operations, the Beech A-35 became one of the first planes to enter this new type service. Central Airlines is using 11 Bonanzas in its feeder airline operation.

troublesome loading ramp, the step-door reduced station time appreciably. Introduction of the postwar equipment was accompanied by the conversion of a sizable proportion of the scheduled airline DC-3 fleet to a comparable set-up (see page 18). Combined with improvements in cargo loading the DC-3 step door helped to reduce station time from 10-12 minutes to well below five minutes.

The introduction of the Boeing Stratocruiser into commercial service was undoubtedly the high mark in 1949 equipment doings. The economic aspects of Stratocruiser operation must be assessed over periods much longer than its operating history to date. One thing is certain: The Stratocruiser carries with it the prestige that the Queen Mary brought to the ocean-going world. As with most other postwar equipment, the Stratocruiser is already established as a breaker of transport records.

In 1948 the airline equipment program seemed hopeless. Struggling to recover from catastrophic financial losses in 1947, the airlines were in no position to consider new airplane purchases. But during 1949 there was new life evidenced in new equipment programs.

Toward the end of 1949 the aircraft manufacturers had a $96,259,000 backlog of undelivered transport orders. While $36,000,000 of this sum was for Boeing Stratocruisers which have since been delivered, the balance represented relatively new orders. There was a $47,534,000 backlog at Lockheed including 20 new Constellations for TWA, five for Capital Airlines, and three for Chicago and Southern. When completed these orders will bring the total number of Constellations built to 213.

Douglas had a backlog of over $12,000,000 including orders for five DC-6's for United Air Lines, three Super DC-3's for Capital, and DC-6's for National, Panagra and Delta. These orders have since been bolstered by additional orders for Douglas DC-6B's (see page 16) by both United Air Lines and American Airlines. This raises the number of DC-6's to about 175 ships. In addition to the firm order for three Super DC-3's, Douglas has a promise of another 16 orders, providing the plane proves itself in service.

Under negotiation late in 1949, and since culminated, was an agreement between The Glenn L. Martin Co. and Trans World Airline and Eastern Air Lines for a total of 65 Martin 4-0-4 transports. (See page 12). The 4-0-4, a pressurized version of the 2-0-2, reactivates the Martin transport production line and may well spell additional transport orders in 1950. This contract alone had a value of $35,000,000.

Orders were not easy to get. The manufacturers were improving their airplanes to attract and generate the market. In 1949 Convair delivered 53 Convair Liners, bringing the total to date to 158. During 1949 Convair completed engineering studies aimed at increasing the ship's gross weight from 40,500 pounds to 41,200 pounds. With these plans completed, airlines will be able to modify the planes now in service to carry 1,112 pounds additional payload on short haul flights and 612 pounds on longer trips. Maximum payload will thus be raised from 8,150 to 9,262 pounds.

It was in 1949 that the ground work was laid for the adoption of the Allison T-38 turbo-prop engine to the Convair Liner. As a result of these studies, Allison has since purchased a Convair and is working out a prototype installation of the turbine engines for the mutual benefit of all aircraft manufacturers and airlines. This will represent the first application of turbine powerplants to civil U. S. aircraft.

Meanwhile the Convair Liner, in operation by 12 domestic and foreign airlines, made an interesting safety record, completing over 1,000,000,000 passenger miles without a fatality.

The Lockheed Constellation last year became the first U. S. transport to be approved under ICAO regulations. In this sixth year of Constellation service the plane obtained its fifth increase in allowable take-off gross weight. In its service life the Connie has moved from 96,000 pounds gross weight to 107,000 pounds. Each of these increases was an operating bonus to the airlines.

Douglas, too, offered improved airplanes to the industry. As yet the Super DC-3 has found very little market, yet the Super DC-3 proposal was a bold attempt to provide the airlines with a reasonably priced replacement for the tried and proven DC-3. While Capital has been the only airline to order Super DC-3's,

Cessna 190—The same CAB ruling which enabled Central to operate Bonanzas encouraged Mid-West Airlines to adopt the Cessna 190 for use on its new routes. Mid-West is operating 7 Cessna 190's. Sister-ship to this plane, the Cessna 195, is in service with Purdue Aeronautics which operates an airline in connection with its many training courses.

many lines have yet to make their decision on post-war equipment.

One of the biggest factors working against the Super DC-3 was the apparent satisfaction of many of the lines with the regular DC-3; other operators couldn't afford to invest in new equipment and still others appeared to be waiting for the acid test of the ships usefulness—its early operation over Capital's routes.

Douglas flew the DC-6A Liftmaster for the first time in 1949. The Liftmaster is an elongated DC-6 designed for cargo operations. In addition to five feet added fuselage length, the DC-6A offers improved engine power, a built-in electrically operated hoist, and other advantages. At year's end there were no orders announced for the Liftmaster but two airlines, United and American, had placed orders for DC-6B's, the passenger version of the Liftmaster. Like the Constellation production line, the Douglas DC-6 line looked as though it would go well into 1951 and probably beyond that.

The Martin 2-0-2's which Northwest has in operation are also due for improvements which will benefit the airlines. In the process of recertificating the 2-0-2 to establish the data for later 4-0-4 certification, Martin is expected to gain an additional 3,100 pounds payload, a change from 39,900 pounds to 43,000.

RELIABILITY

WHILE improvements in the aircraft themselves were to be seen on all sides, reliability of operations, the result of experience alone, was bringing about even more noticeable changes (page 58). Increased knowledge of the problems and potentials of the airline planes had increased the percentage of scheduled mileage completed, and brought noticeable improvements in "on time" operations (see page 58).

It is true that in many cases operating costs advanced during 1949. But operating costs did not generally advance in any appreciable proportion to the general rise in the cost of wages and parts, both factors beyond the complete control of the airlines.

Engine and related accessory maintenance has always represented a sizable portion of troubles resulting in delayed and interrupted flights. Yet in 1949 while on-time operations were generally improved and flight interruptions minimized, engine and propeller overhaul times moved to new highs. During the early postwar years, engine overhaul times of 600-800 hours were common. Now (see page 70) there are many engines with 1,000 or 1,200-hour overhaul periods. One airline, Northwest, has 1,500 hour periods on the Pratt & Whitney R-2000 engine.

Propeller overhaul times have reflected similar improvements in reliability and consequent reduction in operating costs. Note (page 72) that many of the current model propellers in airline service have overhaul periods between two and three thousand hours and one is actually set at 4,200 hours.

The impact of the continuing time extensions on component overhaul, the move to "on condition" maintenance and progressive overhaul, and the operation of improved airline maintenance bases with special equipment (see page 70) for speeding maintenance promises ever improving financial statements for the airlines in future years.

ment had lowered minimums at the nation's key airports to a point where many airports were authorized for minimums of 200-foot ceiling and ½-mile visibility, virtually halving earlier minimums. At Arcata, California, site of the Landing Aids Experiment Station, Southwest Airways was approved for landings with 100-foot ceiling and ¼-mile visibility, an all time low.

Important decisions on runway and approach lighting were reached, although much remained to be done in future months. The fact was that controversies were shaping ideas and by year's end installations of high intensity approach lights were underway. With all components of the ILS system installed and operating, there were some hopes of lower operating limits. Actually obstructions along the approach courses minimized this possibility. Even without the obstructions, lower minimums, below 200 and ½, would not provide startling improvements in operations. The amount of time that weather minimums are below this figure is very small.

Apparently the full utilization of radar for precision approaches, traffic control and parallel applications will be the field in which the biggest immediate gains are made.

Aerojet JATO—A new type engine was introduced into commercial airline service during 1949 when Braniff Airways (see page 62) received CAA authorization to use Aerojet JATO units for assisted take-offs from La Paz Airport in Bolivia, 13,398 feet above sea level. Use of Jato will permit four-engine equipment to operate into La Paz for first time on a sound economic basis. The Aircraft Industries Association is now working with CAA, ATA, and the airlines toward establishment of a fixed JATO policy.

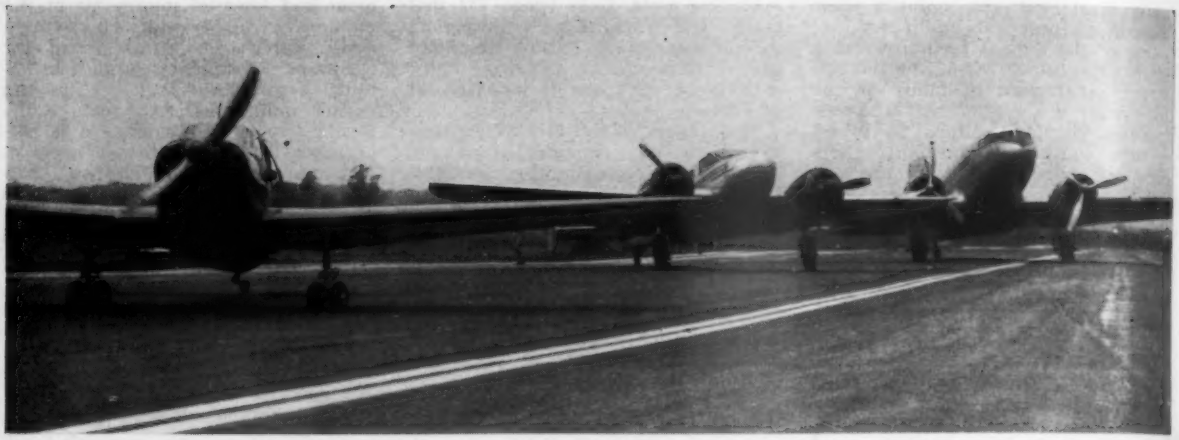
RADAR AIDS

CERTAINLY the greatest amount of credit for improved regularity and safety of airline operations goes to the implementation of the earliest phases of the Radio Technical Commission for Aeronautics' air navigation and traffic control program (see pages 76 and 77). At year's end CAA had installed 99 instrument landing systems, about 300 omni-directional radio ranges, and was underway on procurement and installation of radar GCA sets. Early in 1950 contracts were let for 450 sets of distance measuring equipment for installation at omni-range sites.

Perfection of the ILS equipment, use of GCA for monitoring and the combined experience and training of flight crews in use of the new equip-

JET DESIGNS

THE YEAR 1949 was the year of the jets. A sleeping industry was aroused to the active realization that



Cross-Wind Gears— Shown here are the three types of cross-wind landing gears which resulted from a CAA development contract with three companies. First commercial use of the cross-wind landing gear on passenger aircraft will take place this summer when Capital Airlines takes delivery on their Douglas Super DC-3's equipped with Goodyear cross-wind gears. The three developments are shown here, left to right, with the Bellanca-developed gear on the Bellanca, a gear designed by All American Airways on a twin-engine Beech and the Douglas DC-3 equipped with the Goodyear developed gear. Introduction of the cross-wind gear resulted in a CAA ruling prohibiting the use of Federal Aid Airport funds for developing airports with wind-rose runways, except under special circumstances. The ruling will ultimately result in closer-in airports.

the British aviation industry had made concrete strides toward placing jet transports in commercial operation. The U. S. manufacturing industry certainly has the know-how to produce jet transports. It has produced more jet military aircraft than any nation.

But the fact that in 1949 the British flew the de Havilland Comet, a 500 mph jet transport, as well as several promising turbo-prop transports, was enough to stir every manufacturer, airline operations executive and Congressional leader. The condition was aggravated because the Comet appeared to have all the desirable characteristics of jet transports as visualized in this country.

Not Ready

Regardless of these factors, the U. S. was not and is not ready for jet transport operations that mean appreciably higher speeds. The U. S. will be ready for jet transports when the aircraft themselves are available but there is time for logical development. Meanwhile the U. S. manufacturers and airlines appear to have set their sights a little higher and are looking forward to turbo jet transports with speeds in the 550-600 mph range and turbo-prop aircraft with 400 mph and up speeds.

Many problems remain to be ironed out before the jet transport can be introduced into scheduled airline service. Probably the biggest problem is the financing of its construction. It has been reliably estimated that a turbo jet transport will cost $18,000,000 to develop and test. The manufacturers do not have enough capital to support such a development. Nor do the airlines appear to have the money to purchase such a transport if the development costs are properly allocated. The problem is increased by the inherent advantages of the plane type. The higher speeds of jet transports will appreciably reduce the number of airplanes required for a particular service. While this will enhance its value to the airlines, it will nonetheless sharply raise unit price.

Apparently financing will have to be supported by the Federal Government. When prototype aircraft legislation was introduced into Congress in past years it met with little approval by either the manufacturers or the legislators. Attention given to British progress in the press and through many other channels crystallized thinking in this regard and prototype legislation now seems quite possible. The means by which Federal support will be extended is still doubtful but a final decision for or against such legislation in the near future will probably start the manufacturers in motion on jet designs.

Meanwhile three turbo-jet engines (see page 54) have been approved by CAA for commercial use. At the time of their certification this appeared to be but a token gesture since no plane designs were available for the powerplants. However, commercial certification of these engine types set a pattern for future engines and the U. S. now has commercially approved jet engines.

From a commercial standpoint the announcement of the Allison T-40 and T-38 turbo-prop engines for military use appeared to offer more promise for immediate application to transport aircraft. As indicated above, Allison has purchased a Convair Liner and is proceeding with installation designs to equip the airplane with two T-38 engines, each rated at 2750 equivalent horsepower.

Meanwhile, aircraft manufacturers have seized the opportunity to draw up specifications of their present aircraft with T-38 or T-40 engines. (see page 23). Among the designs actually offered are the Douglas DC-6, Douglas C-124, the Boeing Stratocruiser, Convair C-99, Fairchild C-119, and probably others as yet undisclosed. The performance characteristics of the Allison turbo-prop appears most encouraging but service experience with the engine is still very limited.

JET DESIGNS

Big equipment issue of the year involves turbine-powered transports. U. S. manufacturers have already proposed adaptations of several present models to provide for use of Allison jet T-38 and T-40 engines, and are making good strides toward overcoming early British jet advantage.

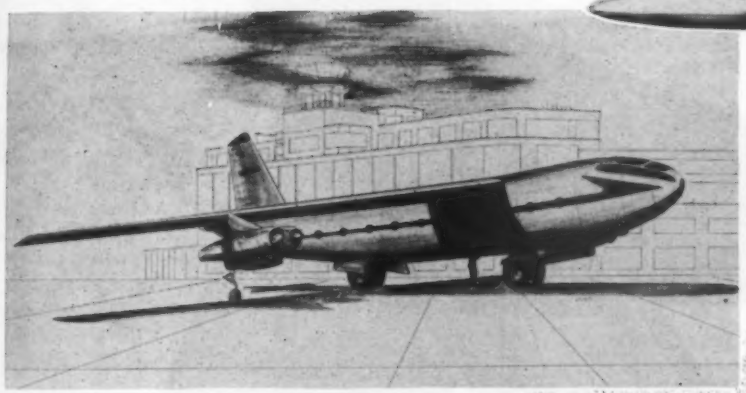
As the industry enters the year 1950 the question of turbine powered aircraft designs appears to be the big issue. Jets are coming, but the airlines are just getting to a point where their equipment is reliable to a degree where this reliability can be sold. The increasing traffic figures reflect this growing reliability. There is no question whatever that the increased speed, lower noise levels and related advantages of the turbine transport will be offset for some time by a reduction in operating reliability. This is being carefully weighed.

This was but a cross section of the greatest air show of all time. The truly encouraging aspect of this show is that it is still going on. With present day aircraft reaching toward their peak of usefulness, the turbine powered aircraft is now around the corner offering new challenges to the industry. The challenges will not go unanswered.

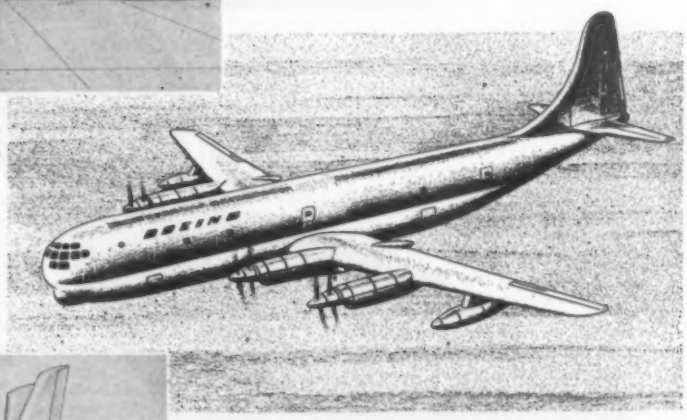
Jets are coming . . .

CONVAIR'S twin engine Convair Liner powered by two Allison T-38 engines, each rated at 2750 ehp.

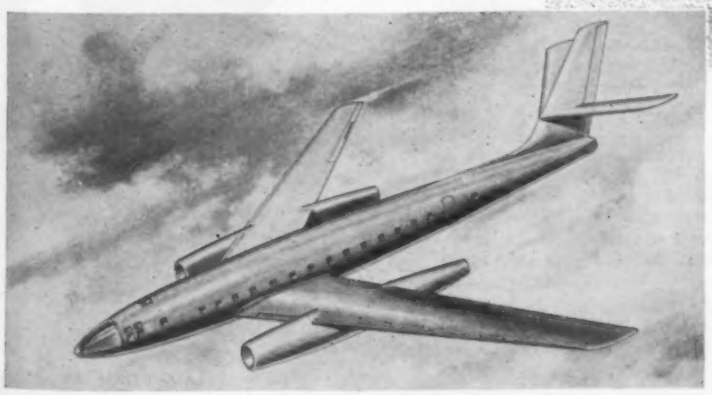
LOCKHEED'S tentative 150,000 pound jet transport powered by four turbo jet engines. Cruising speed 530 mph.



BOEING'S proposal for a 500 mph four engine turbo jet based on the design of the USAF Stratojet.



BOEING'S proposal for a turbo-prop version of the USAF Stratofreighter. Engines are the Allison T-40's.



REPUBLIC'S proposal for a turbo jet version of the Rainbow, capable of speeds in the 550-600 mph range.

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T-33
F-90

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The world's first mass producer of jets, Lockheed established this leadership with the F-80 *Shooting Star*, America's first operational jet airplane. This fighter, like other Lockheed jets (the T-33 two-place jet trainer and the new F-94 interceptor), is noted for its speed, versatility and strength.

Carrying on this tradition is the newest member of the Lockheed jet family, the rugged, twin-engined F-90 Jet Penetration Fighter, now undergoing evaluation tests by the U.S. Air Force.

This broad experience in the development of practical jet aircraft is invaluable in the Lockheed laboratories where the designs of the future are taking shape today.

LOCKHEED

Aircraft Corporation, Burbank, California

Look to Lockheed for Leadership

F-94

1949
Biggest Postwar Profit Year

●*Domestic trunklines*	$24,437,000
●*International lines*	$20,397,000
●*Feederlines (loss)*	$259,000
●*TOTAL (before income taxes)*	$44,575,000

DOMESTIC TRUNKS

A $48,000,000 gain in passenger and freight revenues enabled the scheduled domestic trunk airlines to finish the year 1949 with the biggest operating profit since the war.

With operating revenues totaling $464,622,974 and operating expenses aggregating $440,185,739, the 19 trunklines showed a net operating income of $24,437,238 last year—compared with a slim operating net of $2,292,108 in 1948.

What the net after Federal income tax will be is a matter for conjecture, but it is expected to be somewhere between $12,000,000 and $15,000,000. Substantial net losses were recorded in 1948, 1947 and 1946.

Last year's operating revenues were 11.1% above the $418,002,877 collected by the 16 carriers in 1948, while the operating expenses were up only 5.9% over the 1948 figure of $415,710,766. Three carriers, TWA, Chicago and Southern and Hawaiian Airlines, actually effected reductions in operating expenses for 1949, as compared to 1948. Only Hawaiian, which was subjected to certificated competition last year for the first time, reported lower operating revenues than in 1948.

Passenger revenues for the year were up from $338,623,181 to $381,913,324, an increase of 12.8%, and freight revenues were up 32.1%, from $14,126,738 to $18,662,021. Mail revenues were $3.2 million lower than in 1948.

INTERNATIONAL

U.S.-FLAG international airlines earned a net operating profit of $20,397,459 last year, according to incomplete returns filed with the Civil Aeronautics Board.

This was nearly 50% greater than the $14,014,451 operating net earned by the same carriers the year before. December reports of Eastern Air Lines, Pan American-Grace Airways, and Pan American World Airways were not available.

Only four of the carriers—American Overseas, Colonial, Eastern and National—had net operating losses, and the December figures in all probability would convert Eastern's 11-month loss of $28,452 into an operating profit. Five of the 12 international carriers showed operating losses in 1948.

The incomplete reports showed mail pay for the internationals running more than $16,000,000 ahead of 1948 payments, and the complete reports might boost this increase to close to $20 million.

FEEDERS

IF THE late-starters were separated from the early-starters, the 16 operating feeder airlines would have made a fairly good financial showing in 1949. As it was, the group had an aggregate net operating loss of only $259,063, according to reports filed with the Civil Aeronautics Board.

This loss was based on total operating revenues of $20,799,510 and total operating expenses of $21,058,576. However, six of the 16 carriers did not begin certificated operations until last year and had heavy pre-inaugural expenses for which there were no offsetting revenues.

The six newcomers in the field—All American, Central, Mid-West, Southern, Turner and Wiggins—had a combined net operating loss of $721,217, whereas the 10 feeders that had been in business for more than a year had an aggregate operating net profit of $462,154.

Notable revenue gains were reported by Piedmont, Trans-Texas, Pioneer and Wisconsin-Central, while Southwest and West Coast achieved the distinction of reducing their operating expenses from the previous year. Operating revenues for the feeder group were up from $15,163,005 in 1948 to $20,799,510 last year, a gain of 37.2%, whereas operating expenses for the group rose 41.7%, from $14,869,061 to $21,058,576.

(See footnote page 80 for dates on which various feederlines began service.)

Turn page for comparison of all scheduled airline revenues—expenses for 1948-49. Data from official airline reports to CAB.

U. S. Airline Revenues--Expenses, 1949-48

Scheduled Domestic

	Passenger Revenues 1949	Passenger Revenues 1948	Freight Revenues 1949	Freight Revenues 1948	Express Revenues 1949	Express Revenues 1948	Mail Revenues 1949	Mail Revenues 1948
American	$84,915,565	$73,756,376	$5,962,307	$4,321,175	$1,836,438	$1,880,629	$5,379	652,773
Braniff	11,393,620	10,661,171	275,272	264,633	266,181	282,745	2,321	074,277
Capital	19,237,207	15,810,523	1,521,340	1,103,237	567,937	623,808	4,567	004,958
Caribbean	522,995	412,712	32,898	18,301	.....	.....	209	161,328
C & S	6,330,851	6,081,590	150,418	119,879	169,304	202,061	1,800	991,989
Colonial	3,103,724	2,457,909	45,743	22,519	27,132	20,320	1,225	952,610
Continental	3.557,067	3.255.528	90,164	65,759	35,983	39,108	1,378	362,907
Delta	12,635,875	10,326,159	401,566	357,075	209,499	268,850	2,384	258,130
Eastern	61,293,018	58,875,251	1,804,428	1,237,963	1,202,521	1,313,752	3,246	969,157
Hawaiian	2,931,966	3,474,871	291,016	283,907	130,246	133,660	97	27,994
Inland*	1,967,002	1,563,506	30,721	21,496	21,705	20,164	640	651,196
MCA	5,764,127	5,495,433	89,592	71,898	73,919	68,626	1,467	208,299
National	10,228,284	5,484,567	240,678	134,167	187,524	115,715	2,024	448,549
Northeast	3,992,450	3,241,913	82,606	60,535	45,886	46,910	1,565	272,398
Northwest	22,497,714	18,420,989	1,003,550	568,827	554,816	601,577	2,962	425,077
Trans Pac	344,919	.....	14,782	.....	489	.....	.....	.....
TWA	52,750,808	49,256,941	2,265,824	1,794,791	1,586,128	1,978,531	5,719	769,942
United	72,388,958	63,798,053	4,258,363	3,515,365	2,073,266	2,398,384	6,482	410,708
Western*	6,057,174	6,249,689	100,753	165,211	99,004	102,859	1,863	484,550
TOTALS	**$381,913,324**	**$338,623,181**	**$18,662,021**	**$14,126,738**	**$9,087,978**	**$10,097,699**	**$45,277**	**036,852**

*Operations of Western and its subsidiary, Inland should be considered as consolidated, although reports are filed separately as shown here.

International Airlines

	Passenger Revenues 1949	Passenger Revenues 1948	Freight Revenues 1949	Freight Revenues 1948	Express Revenues 1949	Express Revenues 1948	U. S. Mail Revenues 1949	U. S. Mail Revenues 1948
American	$ 3,247,799	$ 2,887,457	$ 221,220	$288,791	$ 836	.....	$ 95	60,259
AOA	15,430,391	15,412,944	.....	.....	1,809,841	$1,546,461	4,187	937,790
Braniff	2,233,310	525,345	94,138	15,103	.....	.....	1,503	569,497
C .& S	2,081,426	1,026,474	109,434	56,444	.....	.....	1,504	910,838
Colonial	791,704	1,013,241	21,341	36,255	.....	.....	342	154,933
Eastern*	658,849	781,935	78,057	100,275	.....	.....	40	30,174
National	1,111,874	560,538	.....	.....	115,133	97,722	111	94,257
Northwest	5,376,228	5,653,789	1,572,140	873,447	32,772	28,511	5,665	930,901
Panagra*	9,665,494	10,449,185	.....	127	870,378	998,400	3,397	943,771
Pan American . Latin Amer.*	37,228,498	40,054,824	.....	.....	6,291,908	8,131,600	13,702	010,181
Atlantic*	25,812,628	25,444,696	.....	.....	3,255,057	2,931,079	19,082	936,202
Pacific*	15,782,689	18,419,776	.....	.....	2,459,852	2,452,234	12,821	974,497
Alaska*	2,340,902	2,463,162	.....	.....	859,650	792,371	1,477	975,606
TWA	25,807,354	23,434,106	.....	.....	2,756,408	2,341,319	9,228	291,806
United	3,621,537	3,127,515	.....	.....	132,456	88,449	588	814,956
TOTALS	**$151,190,683**	**$151,254,987**	**$2,096,330**	**$1,370,442**	**$18,584,291**	**$19,408,146**	**$73,548**	**035,668**

* Figures for 1949 are thru month of November only.

Feeder Airlines

	Passenger Revenues 1949	Passenger Revenues 1948	Freight Revenues 1949	Freight Revenues 1948	Express Revenues 1949	Express Revenues 1948	Mail Revenues 1949	Mail Revenues 1948
All American	$606,833	$.....	$.....	$.....	$21,574	$12,002	$1,347	070,137
Central	6,991	.....	.....	.....	.....	.....	136	.....
Challenger	436,293	290,582	17,004	7,882	10,443	7,182	983	040,266
Empire	312,467	215,107	.....	.....	4,222	2,491	655	066,738
Mid-West	3,729	.....	.....	.....	.....	.....	64	.....
Monarch	411,792	356,925	22,368	18,667	7,599	6,147	1,121	037,483
Piedmont	1,118,530	540,182	18,652	4,538	13,476	6,470	1,249	010,068
Pioneer	1,492,224	1,300,407	25,681	12,559	10,667	8,523	1,718	048,205
Robinson*	414,447	93,236	6,880	2,029	.....	.....	417	097,004
Southern	101,077	.....	.....	.....	5,785	.....	473	.....
Southwest	1,059,558	905,102	36,007	25,451	14,136	12,647	1,248	001,332
Trans-Texas	537,579	264,687	11,013	3,235	7,940	3,206	1,723	079,473
Turner*	2,450	.....	.....	.....	20	.....	8	.....
West Coast	515,927	496,861	.....	.....	5,928	5,379	721	021,939
Wiggins	2,411	.....	.....	.....	.....	.....	25	.....
Wis.-Central	271,576	113,649	.....	.....	8,364	5,963	1,096	032,500
TOTALS	**$7,293,884**	**$4,576,738**	**$137,605**	**$74,361**	**$110,154**	**$70,010**	**$12,967**	**055,145**

*Figures for 1949 are through month of November only.

Dome nk Airlines

U. S. Airline Revenues--Expenses, 1949-48

Ma enues 194 948	Total Operating Revenues 1949	Total Operating Revenues 1948	Total Operating Expenses 1949	Total Operating Expenses 1948	Net Operating Income 1949	Net Operating Income 1948	
$5,37 52,773	$99,404,070	$85,744,354	$89,961,916	$87,459,213	$9,442,154	$ —1,714,859	..... American
2,32 74,277	14,527,520	13,509,310	14,050,713	12,845,883	476,807	663,427	..... Braniff
4,56 04,959	26,905,836	23,325,122	25,586,399	22,490,004	1,319,437	835,118	..... Capital
20 61,328	792,269	605,649	801,241	602,983	—8,972	2,666	..... Caribbean
1,80 91,989	8,583,730	8,432,241	7,783,557	7,797,320	800,173	634,920	.....C & S
1,22 62,610	4,445,132	3,582,427	4,228,691	3,556,081	216,441	26,346	..... Colonial
1,37 62,907	5,247,499	4,879,048	5,560,788	4,598,051	—313,289	280,996	.... Continental
2,38 58,139	15,897,974	14,364,961	15,191,108	13,173,542	706,866	1,191,419	..... Delta
3,24 69,157	68,853,652	65,585,550	64,908,783	60,225,590	3,944,869	5,359,960	..... Eastern
37 27,994	3,518,404	4,044,339	3,392,732	3,830,008	125,672	214,330	..... Hawaiian
640 51,196	2,682,934	2,270,766	2,178,305	2,090,170	504,630	180,596	..... Inland*
1,46 08,299	7,515,155	6,919,680	6,975,367	6,718,062	539,789	201,618	..... MCA
2,02 48,549	12,983,817	7,376,112	12,931,162	8,942,689	52,655	—1,566,577	..... National
1,56 72,398	5,793,502	4,644,339	5,728,267	5,108,924	65,234	—464,585	..... Northeast
2,96 25,077	27,360,509	23,250,411	28,541,587	25,890,748	—1,181,078	—2,640,337	..... Northwest
....	529,759	.....	834,559	.....	—304,799	.....	..... Trans Pac
5,71 89,942	63,710,914	61,868,113	61,115,273	61,195,631	2,595,641	672,482	..... TWA
6,48 10,708	87,010,702	79,399,589	82,035,526	80,930,695	4,975,176	—1,531,106	..... United
1,86 84,550	8,859,596	8,200,866	8,379,765	8,255,172	479,832	—54,306	..... Western*
$45,27 06,852	$464,622,974	$418,002,877	$440,185,739	$415,710,766	$24,437,238	$2,292,108	..... TOTALS

International Airlines

U. S. enues 194 948	Total Operating Revenues 1949	Total Operating Revenues 1948	Total Operating Expenses 1949	Total Operating Expenses 1948	Net Operating Income 1949	Net Operating Income 1948	
$ 95 60,259	$ 3,801,803	$ 3,541,615	$ 3,750,839	$ 3,681,808	$ 50,964	$ —140,194	..... American
4,18 37,790	23,416,605	23,537,458	23,808,198	21,653,066	—391,592	1,884,392	..... AOA
1,50 69,497	3,925,611	1,129,667	3,920,711	1,282,277	4,900	—152,610	..... Braniff
1,50 10,838	3,784,794	2,020,611	3,419,907	1,766,194	364,887	254,417	..... C & S
34 54,933	1,165,254	1,411,407	1,517,659	1,627,216	—352,405	—215,809	..... Colonial
40 30,174	812,500	923,459	840,952	982,414	—28,452	—58,954	..... Eastern*
111 94,257	1,398,145	778,006	1,442,494	933,595	—44,349	—155,589	..... National
5,66 30,901	13,140,508	11,895,544	10,478,448	10,584,730	2,662,060	1,310,814	..... Northwest
3,39 43,771	15,222,319	15,639,044	13,571,861	14,803,376	1,650,458	835,667	..... Panagra*
							Pan American
13,70 10,181	60,835,985	62,244,242	57,204,476	59,419,720	3,631,508	2,824,522	.. Latin Amer.*
19,08 36,202	51,252,407	44,883,293	46,782,749	41,113,680	4,469,658	3,769,613	..... Atlantic*
12,62 74,497	32,136,610	32,821,125	29,512,273	31,223,032	2,624,339	1,598,093	..... Pacific*
1,47 75,606	4,770,539	5,260,542	4,470,275	5,054,276	300,265	206,266	..... Alaska*
9,22 91,806	42,274,321	39,181,846	37,562,333	37,663,753	4,711,988	1,518,093	..... TWA
58 14,956	4,543,137	3,841,005	3,799,908	3,305,185	743,230	535,820	..... United
$73,54 35,668	$262,480,538	$249,108,864	$242,083,083	$235,094,322	$ 20,397,459	$ 14,014,541	..... TOTALS

Feeder Airlines

Ma enues 194 948	Total Operating Revenues 1949	Total Operating Revenues 1948	Total Operating Expenses 1949	Total Operating Expenses 1948	Net Operating Income 1949	Net Operating Income 1948	
$1,34 70,137	$1,987,490	$983,607	$2,425,538	$1,070,701	$ —438,048	$ —87,094	.. All American
13	143,922	.....	154,751	.....	—10,829	.....	..... Central
96 40,266	1,455,336	1,150,074	1,468,522	1,252,793	—13,186	—102,719	.... Challenger
65 66,738	988,148	1,303,352	900,799	876,068	87,349	427,285	..... Empire
6	68,066	.....	92,765	.....	—24,699	.....	..... Mid-West
1,12 37,483	1,582,320	1,435,070	1,563,090	1,474,549	19,231	—39,479	..... Monarch
1,24 10,068	2,437,419	1,466,719	2,409,040	1,464,165	28,379	2,554	..... Piedmont
1,71 48,205	3,346,874	2,984,525	3,031,136	2,734,398	315,739	250,128	..... Pioneer
41 97,004	844,000	195,227	1,026,258	260,173	—182,258	—64,949	.... Robinson*
47	582,361	.....	806,037	.....	—223,675	.....	..... Southern
1,24 01,332	2,398,581	2,363,753	2,263,878	2,278,516	134,702	85,237	.... Southwest
1,72 79,473	2,286,230	1,552,486	2,249,680	1,424,065	36,550	128,421	... Trans-Texas
0	11,056	.....	18,585	.....	—7,528	.....	..... Turner*
721 21,939	1,253,864	1,023,222	1,264,436	1,293,985	—10,572	—270,763	.... West Coast
25	28,109	.....	44,547	.....	—16,438	.....	..... Wiggins
1,06 82,500	1,385,734	704,970	1,339,514	739,648	46,220	—34,678	... Wis.-Central
$12,90 55,145	$20,799,510	$15,163,005	$21,058,576	$14,869,061	$ —259,063	$293,943	..... TOTALS

The Growing Airline Industry

Assets
$720 Millions

THE U. S. airlines—domestic trunk, feeder and international—were showing a steady rate of growth toward the end of 1949, and the industry's total assets were nearing the three-quarter billion dollar mark.

An analysis of the reports filed with the Civil Aeronautics Board for the year ended September 30, 1949, shows that the 38 airlines in operation as of that date had total assets of $720 million, an increase of more than $60 million over mid-1948 when 33 companies were operating.

At the end of last September, the depreciated value of the industry's airplanes was $168,361,945, compared

Operating Equipment
$354 Millions

with $137,134,207 in mid-1948. Total flight equipment, including planes, engines, propellers, etc., was valued at $274,632,222, up $34 million over 1948. Total operating property and equipment was worth $354,226,935, an increase of about $22 million.

Construction work in progress has declined substantially in the past three years. In mid-1947, when the airlines were getting their plants into shape following the war, construction in progress amounted to $29,559,844. A year later, the total was $17,030,822, and by last September it had fallen to $8,017,330.

The industry's employment and

Payroll
$295 Millions

payroll were going in opposite directions. There were fewer employes in 1949, but the payroll was larger and the average wage had increased substantially. Mid-1948 saw 82,721 persons employed by the 33 companies, with annual payroll of $287,961,228, and the industry's average wage was $3,481. At the end of September, 1949, employment was 78,915, payroll $295,538,928 and average wage $3,745.

In other words, there were five more companies, the industry employed 3,806 less persons, but payroll was up $7.5 million and average wage

(*Turn to Page* 30)

Selected Airline Expenditures, Year Ended Sept. 30, 1949

Company	Total Assets	Passenger Food Expense	Other Pass. Supplies	Advertising Space	Other Advertising	Aircraft Engine Fuel and Oil	Shop-Servicing Supplies	Employment	Annual Payroll	Average Wage
All American	$3,091,850	none	$953	$52,213	$14,968	$222,950	$16,733	442	$1,473,562	$3,334
American	125,476,403	$2,636,206	711,798	1,438,634	925,460	13,444,660	901,489	10,848 (a)	41,552,396	3,830
American Overseas	26,753,814	322,987	134,314	514,602	319,999	2,926,565	18,256	1,347	5,116,901	3,799
Braniff	14,172,263	407,954	83,558	236,643	176,033	2,445,627	159,374	2,404	8,284,833	3,446
Capital	13,013,469	429,204	99,612	734,653	178,416	3,588,995	178,540	3,195	12,121,918	3,794
Carib-Atl	444,797	39	3,322	11,761	8,382	102,788	4,924	147	353,063	2,402
Central (b)	196,812	none	8	105	55	1,362	220	29	114,432	3,946
Challenger	809,131	5,532	3,392	13,579	4,038	200,644	18,297	115	106,686	3,710
C. & S.	7,447,498	298,208	49,222	210,253	79,891	1,391,171	126,114	1,380	5,133,768	3,720
Colonial	3,586,101	124,536	23,481	127,334	74,270	722,157	18,027	579	2,266,411	3,914
Continental	4,335,522	81,859	15,762	81,838	57,900	658,126	38,101	709	2,747,772	3,878
Delta	12,471,364	361,468	48,199	343,868	104,712	2,041,724	109,610	2,095	7,259,968	3,463
Eastern	53,852,128	1,213,872	128,524	1,548,295	613,637	8,964,054	472,409	7,652	28,508,911	3,725
Empire	614,435	4,652	845	5,444	6,565	140,731	6,643	104	404,607	3,890
Hawaiian	2,732,794	none	6,201	19,631	24,762	275,497	13,927	437	1,781,869	4,078
Helicopter A.S. (c)	390,098	none	none	none	none	856	398	21	86,345	4,112
Inland	968,183	10,408	12,287	16,755	5,034	299,601	2,861	209	948,571	4,538
Los Angeles	357,279	none	none	none	none	29,840	2,396	45	160,241	3,561
Mid-Continent	3,311,542	123,176	17,473	110,339	39,008	839,977	16,821	1,032	3,605,486	3,494
Monarch	896,419	6,954	4,621	18,725	5,870	227,875	13,731	266	943,923	3,549
National	8,428,197	284,853	42,927	360,367	40,725	1,970,336	100,341	1,689	6,195,027	3,667
Northeast	5,276,450	86,359	21,058	73,557	85,352	594,321	69,091	729	2,745,323	3,763
Northwest	45,118,170	670,084	209,505	716,250	186,608	5,143,522	265,842	4,662	19,068,985	4,089
Pan American										
Atlantic	62,206,834	681,166	253,192	913,221	502,909	6,353,429	192,932	3,361	14,643,642	4,357
Latin American	52,455,083	1,103,985	310,670	1,059,893	724,245	7,348,129	699,266	6,764	23,661,933	3,498
Pacific	37,925,792	457,209	113,654	494,744	372,459	3,881,883	144,826	550	459,988	836
Alaska	3,617,786	123,469	12,853	36,068	64,440	603,855	11,779	309	1,560,984	5,052
Gen. Acc. Office	none	none	none	none	none	none	none	1,615	5,572,814	3,451
Panagra	18,030,550	200,120	71,102	221,827	186,413	1,824,055	70,072	1,788	3,181,757	1,780
Piedmont	1,523,892	7,923	3,143	36,866	14,570	366,790	9,278	311	982,006	3,153
Pioneer	1,266,068	31,844	8,050	65,077	27,209	444,795	23,097	442	1,487,558	3,366
Robinson	1,187,865	460	697	9,046	3,470	149,533	6,702	137	469,731	3,429
Southern (d)	706,006	63	639	4,135	2,057	58,928	2,073	163	476,494	2,922
Southwest	1,256,469	33	1,468	28,284	37,397	257,078	10,736	271	1,030,057	3,801
TWA	88,858,940	1,798,910	599,332	1,381,410	1,102,325	13,826,676	551,581	11,433	44,411,735	3,884
Trans-Pacific (e)	700,036	26	1,249	5,832	7,825	43,896	1,808	186	558,714	3,004
Trans-Texas	1,224,258	12,884	5,361	49,384	13,135	296,553	30,633	384	1,176,191	3,063
United	102,392,275	1,463,615	549,795	911,160	689,336	10,378,413	573,451	9,900	39,441,040	3,983
Western	10,715,166	57,316	50,991	169,523	39,925	901,674	70,357	985 (f)	4,055,317	4,117
West Coast	1,125,871	none	588	5,483	15,823	130,065	5,318	163	603,293	3,701
Wiggins (g)	161,846	none	none	351	none	none	none	11	36,860	3,351
Wis.-Central	1,075,272	none	73	1,938	6,595	96,407	5,211	198	747,816	3,777
TOTALS	**$720,176,728**	**$13,007,374**	**$3,599,919**	**$12,029,097**	**$6,761,838**	**$93,195,538**	**$4,963,265**	**78,915**	**$295,538,928**	**$3,745**

(a) Domestic, excluding personnel allocated to AOA
(b) Started in September
(c) Started in August
(d) Started in June
(e) Started in June
(f) Tabulation of employees and compensation before allocation of expenses between Western and Inland
(g) Started in September

NOW...AND IN THE FUTURE

Curtiss Electric Propellers and Turbo-Props

Since the days when propellers were carved from wood by hand, Curtiss Propellers have paced aircraft propulsion progress.

The first all-metal propeller was a Curtiss product. Curtiss-Wright pioneered the electric propeller . . . and the first full-feathering propeller . . . perfected and proved the hollow steel blade . . . introduced automatic synchronization . . . developed the reversible propeller now in universal military and commercial use.

These leading Airlines use Curtiss Electric Propellers

BOEING 377 STRATOCRUISER	American Overseas Airlines United Air Lines
CONVAIR 240	American Airlines CATC (China) Northeast Airlines Swissair
DOUGLAS DC-6	American Airlines BCPA (Australia) Philippine Airlines SAS (Scandinavia)
LOCKHEED CONSTELLATION	Air France Air India BOAC (British Overseas Airways) KLM (Royal Dutch Airways) LAV (Venezuela) QANTAS (Australia) South African Airways
AERO SUD EST SE 2010	Air France

Today, Curtiss Electric Propellers are the standard of quality wherever aircraft fly. They equip the modern post-war transports of the world's leading airlines . . . and superbombers like the Air Force B-36. In over 40 different aircraft models now in operation, Curtiss Electric Propellers have built an international reputation for dependability, durability and flexibility of electrical control.

Against a background of demonstrated performance, Curtiss-Wright faces the dawning era of trans- and super-sonic speeds well prepared to anticipate and meet new trends in military and commercial aircraft . . . to maintain the leadership it has established.

In the same Curtiss-Wright laboratories where present production types were conceived in advance of their time, new propellers have taken shape. Propellers of the future, built by Curtiss-Wright, are being flight tested at speeds up to 600 miles per hour. Turbo-props under development today will be ready when they are needed tomorrow. Every avenue of research is continuously being explored.

Curtiss-Wright propellers will play a major role in the conversion of current experimental aircraft developments into accepted practice. Meanwhile, Curtiss-Wright will continue to produce the propeller types required to maintain America's superiority in the air . . . time-tested Curtiss Electric Propellers of advanced design whose every feature has been proved. *Propeller Division, Curtiss-Wright Corporation, Caldwell, New Jersey.*

CURTISS WRIGHT

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Airlines' Operating Property & Equipment

Flight Equipment

	Depreciated Value End of September, 1949
Aircraft	$168,361,945
Aircraft Engines	40,539,951
Aircraft Propellers	7,030,110
Aircraft Radio Equipment	5,509,885
Miscellaneous Flight Equipment	988,638
Flight Equipment Spare Parts, Assemblies	51,441,665
Improvements to Leased Flight Equipment	933,845
TOTAL FLIGHT EQUIPMENT	$274,632,222

Other Property & Equipment

Passenger Service Equipment	$ 1,191,963
Hotel, Restaurant and Food Service Equipment	1,121,745
Station Communication and Meteorological Equipment	2,079,033
Hangar, Shop, Ramp Equipment	14,038,327
Motorized Vehicles and Equipment	3,369,069
Furniture, Fixtures, Office Equipment	7,265,746
Medical Equipment	65,421
Engineering Equipment	62,733
Airport, Airway Lighting Equipment	244,260
Storage, Distribution Equipment	657,283
Miscellaneous Ground Equipment	894,787
Buildings and Improvements on Land Owned	3,392,861
Buildings and Improvements on Land Not Owned	26,965,982
Improvements to Leased Property	7,769,366
TOTAL OTHER PROPERTY AND EQUIPMENT	$ 69,831,341
Construction Work in Progress	$ 8,017,330
TOTAL OPERATING PROPERTY AND EQUIPMENT	$354,226,935

NOTE: Because certain items have been eliminated from the above accounts, the totals do not represent the sums of the individual items listed.

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air cruises to
MIAMI BEACH
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From Chicago: 7 Days — $147.45
Plus Tax
7 days in Miami Beach hotel, breakfast, sightseeing. Extensions to Havana, Jamaica, Nassau.
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Atlanta, Georgia
2 Smoky Mountains Vacations
Complete sightseeing tours, or week with meals at mountain hotel
From Chicago: $106.70 plus tax
Delta AIR LINES
Nothing Faster — Nothing Finer — Nothing More Dependable

ASSETS

(*Continued from Page 28*)

had increased $264. It is also interesting to note that in mid-1947 employment totaled 87,726, payroll $270,594,937, and average wage $3,084.

The AMERICAN AVIATION analysis also showed that:

- **The industry spent $93,195,538 on gasoline and oil** during the 12 months ended last September. The oil companies' biggest customer was Pan American World Airways, whose divisions bought $18,187,296 worth of petroleum products. Second largest buyer was TWA ($13,826,676) followed by American and United.

- **Shop and servicing supplies** cost the airlines $4,963,265.

- **Feeding its passengers** cost the industry $13,007,374, with American the largest food purchaser ($2,636,206). Other passenger supplies, including such items as blankets, chinaware, gum, cups, napkins, soap, etc., amounted to $3,599,919.

- **The purchase of advertising space** amounted to $12,029,097 for the 12 months, with the PAA divisions in first place (combined expenditures of $2,503,926), Eastern Air Lines second, American third and TWA fourth. Expenditures for other advertising purposes (direct mail, displays, calendars, baggage stickers, etc.) totaled $6,761,838.

Healthy Airlines... challenge for CAB

PROBLEM PARADE

Air Freight — *Mergers* — *Air Coach* — *Feeders*

Non-Skeds — *Mail Pay* — *Route Pattern*

By WILLIAM V. HENZEY

SYNONYMOUS with the highly-advanced technical achievements in the commercial air transport industry last year were the economic developments which, at times, threatened to outgrow the government body charged with regulatory responsibility—the Civil Aeronautics Board.

The smallest independent agency in the Federal Government, CAB found itself with far from the smallest job. From month to month, despite a turnover of about 50 cases every 30 days, the Board was faced with a thousand or more pending applications on which decisions had to be rendered. In addition, it had to conduct studies, formulate policies, satisfy Congressional investigations, and participate in court proceedings in which its jurisdiction had been questioned.

This, for the most part, is typical of the lot of a Federal agency, but it is doubtful if the regulatory ability of any agency was so proportionately outweighed by the industry it was regulating as was CAB by the air transport industry.

No longer is it a question of tracing lines on the blank spots of a map and awarding routes accordingly. As singularly important as that job was, it has become the lot of the present five-man panel to justify the awards of other years or make adjustments where necessary.

Further, it became the responsibility of the Board last year to do something about the growing air freight business and the apparent need for all-cargo carriers. The rapid rise of low-cost air coach services and what to do about the non-scheduled industry also had to be dealt with, at least temporarily. Developments among the feederlines, important merger and interchange proposals, and adequate mail compensation presented other serious problems.

Domestic Route Pattern

Particularly significant was the shift in emphasis on the part of the airlines and CAB in the field of air route development. The lines for the most part were apparently satisfied with their routes, as such, but devoted attention to the elimination of uneconomic stops and the addition of a point here and there which had strategic or financial advantages.

Similarly, CAB directed its efforts to the strengthening of existing routes by adding or subtracting specific points, sometimes on its own initiative or upon requests of the airlines. Early in the year, however, the Board indicated it wasn't certain that some route grants, made years before, should not be re-awarded to other companies or dissolved in part.

Accordingly, it ordered investigations of the systems of two certificated carriers, Western and Northeast. With a similar investigation of National Airlines underway, it brought the total of so-called "dismemberment" cases to three.

However, with the exception of the National case, these have a long road of red tape to travel before a final decision is rendered. It is even possible that with the improved financial showings of all three, the status quo will be maintained, either by a verdict in the case after all procedural steps are taken, or by withdrawal of the investigation orders.

Minor Additions

Typical of the actual awards made to existing lines was the authorization granted Eastern Air Lines to serve Pittsburgh for the first time. Add to that Eastern's receipt of two small Florida points, Gainesville and Ocala, and a revision of Capital's route pattern benefiting upper Michigan cities, and you get an idea of the contrast in CAB handouts last year as compared to previous post-war years when the awarding of whole new route systems was considered the order of the day.

On the other hand, such cities as Peoria, Ill., Jackson, Mich., Abilene, Tex., and Wausau, Wis., were considered "uneconomic" by the airlines originally certificated to serve them, and in certain cases, CAB permitted the abandonment of service. This phase of the development is considered in higher industry circles as one of the most important of the year in that it contributes to faster routes for trunklines and more substantial routes for feeders, particularly where the feeder takes over where the trunk left off.

Not all of 1949's route developments were as painstakingly specific, however. A new helicopter line, Helicopter Air Service, Inc., was awarded a five-year certificate to carry property and mail within a 50-mile radius of Chicago. Five feederlines, Wiggins, Turner, Mid-West, Southern,

Policy Makers— Pictured in a customary role conducting oral argument in one of last year's many important cases are the five current members of the Civil Aeronautics Board. Reading from left to right, they are: Harold A. Jones, Oswald Ryan, Chairman Joseph J. O'Connell, Jr., Josh Lee, and Russell B. Adams. Ryan has been a member since the Board was created by the passage of the Civil Aeronautics Act in 1938, while Lee has served uninterruptedly since February, 1943. The others, Chairman O'Connell and Members Jones and Adams are two-year men.

CAB Photo

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TRANS WORLD

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these great airlines have chosen this most advanced transport to
Modernize Their Twin-Engine Fleets

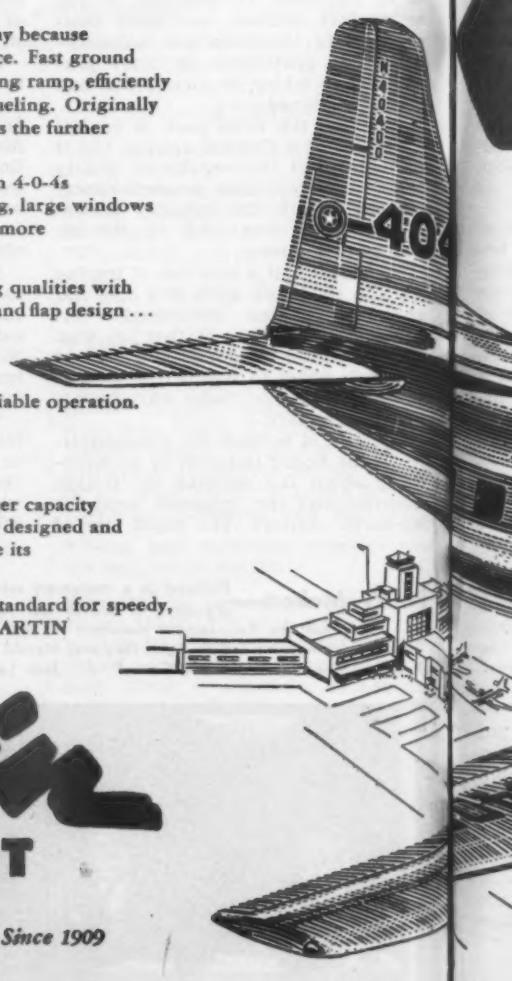
OPERATING ECONOMY! Martin 4-0-4 Airliners will offer maximum economy because of high revenue capacity, high cruising speed and low cost of maintenance. Fast ground loading will mean shorter stops because of such features as built-in loading ramp, efficiently arranged cargo compartments, fast taxi speed, high-speed underwing refueling. Originally designed for low-cost maintenance, the 4-0-4's basic configuration affords the further improvements developed through actual airline experience.

PASSENGER APPEAL! Pressurized, air-conditioned, comfortably quiet Martin 4-0-4s will put passengers in the lap of luxury. Spacious interior, modern styling, large windows and seats . . . *plus* shorter trip times . . . mean more appeal for travellers, more traffic for airlines.

DEPENDABILITY! Martin 4-0-4 Airliners will have excellent low-speed flying qualities with higher cruising speeds and consequent economy because of efficient wing and flap design . . . and yet the 4-0-4 can be operated into and out of smaller airports, aiding the expansion of air travel. Built-in aerodynamic stability permits wide range of loading passengers and cargo. Thermal anti-icing, tricycle landing gear, convenient pilot compartment . . . contribute to reliable operation.

DESIGN WITH A FUTURE! Present structural and performance margins of the Martin 4-0-4 will permit gross weight, payload and power plant changes to meet future airline requirements without altering the basic configuration. For air coach service, the 4-0-4's passenger capacity can be increased from 40 to 48 or 53 seats. And the Martin 4-0-4 will be designed and stressed for conversion to turbo-prop engines . . . to substantially increase its operating speed and extend its useful life by many years.

The Martin 4-0-4 is the twin-engine airliner with a future . . . the *new* standard for speedy, dependable, economical twin-engine fleet operation! THE GLENN L. MARTIN COMPANY, Baltimore 3, Maryland.



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and Central, inactive until last year, commenced operations under limited certificates.

All-Freight Carriers

Numerous domestic air freight forwarders were awarded letters of registration with the total at the end of the year passing the 20 mark. And, of perhaps greatest importance, four lines were certificated to carry cargo only.

Culmination of efforts begun at the close of the war to gain official CAB sanction as freight-only carriers came for Slick Airways, The Flying Tiger Line, U. S. Airlines, and a Texas carrier, Airnews, Inc., last spring. It marked the end of a long procedural battle and the beginning of a five-year experiment which, CAB said, will serve to stimulate further the spectacular growth of air freight without subsidy and with little or no diversion from the existing traffic of the certificated carriers.

Protests followed in which the passenger-cargo-mail carriers claimed there not only would be substantial diversion from their cargo revenues, but that the all-cargo lines wanted a foot in the door before requesting authority to carry, and receive compensation for, the carriage of mail.

Notwithstanding, the new freight carriers immediately began scheduled operations for the first time and the results at the end of the year indicated that the vast cargo potential anticipated by CAB would be realized.

To date, no other all-cargo lines have been certificated, but the groundwork was laid last year for the possible entrance of three more such carriers in the international or overseas fields. Expected soon are decisions on applications of Transocean Air Lines and Seaboard & Western Airlines to operate transoceanic routes, while a Board examiner has recommended that Riddle Aviation Co. be certificated between New York and San Juan.

Scheduled Air Coach

Reticent about giving official sanction until last September, CAB then announced it was prepared to approve limited-scale experiments in the air coach field. It officially blessed the efforts of Capital, Northwest, and TWA, pioneers of the 4c per mile plan, and encouraged not only expanded efforts on the part of those three, but Western, National, Eastern, and Delta, all of whom had proposed coach operations and were awaiting a go-ahead signal. Also, the door was opened for other lines which could justify, on an economic basis, additional low-fare services.

As a result, at the year's end, there were daily scheduled coach flights between such pairs of points as New York-Los Angeles, New York-Miami, Chicago-Miami, Chicago-New York, New York-New Orleans, Seattle-New York, Portland-Chicago, and Seattle-Los Angeles.

Non-Scheduled Carriers

The non-skeds, officially termed "large irregular carriers," are in the middle of a two-pronged attack on their ability to survive. On one side, the scheduled carriers, through their coach activities, are making significant inroads on the non-sked's hitherto-exclusive market. On the other, CAB has tightened its regulations and, through its enforcement officers, has instituted proceedings aimed at elimination of any large irregular found guilty of wilful infractions.

Also, the Board last year withdrew a blanket-exemption under which all non-skeds operated previously, and required each carrier to file an application for individual exemption. Ninety-six responded, but because of the enforcement actions and the effect of scheduled coach services, it is believed less than half that number are still in active operation.

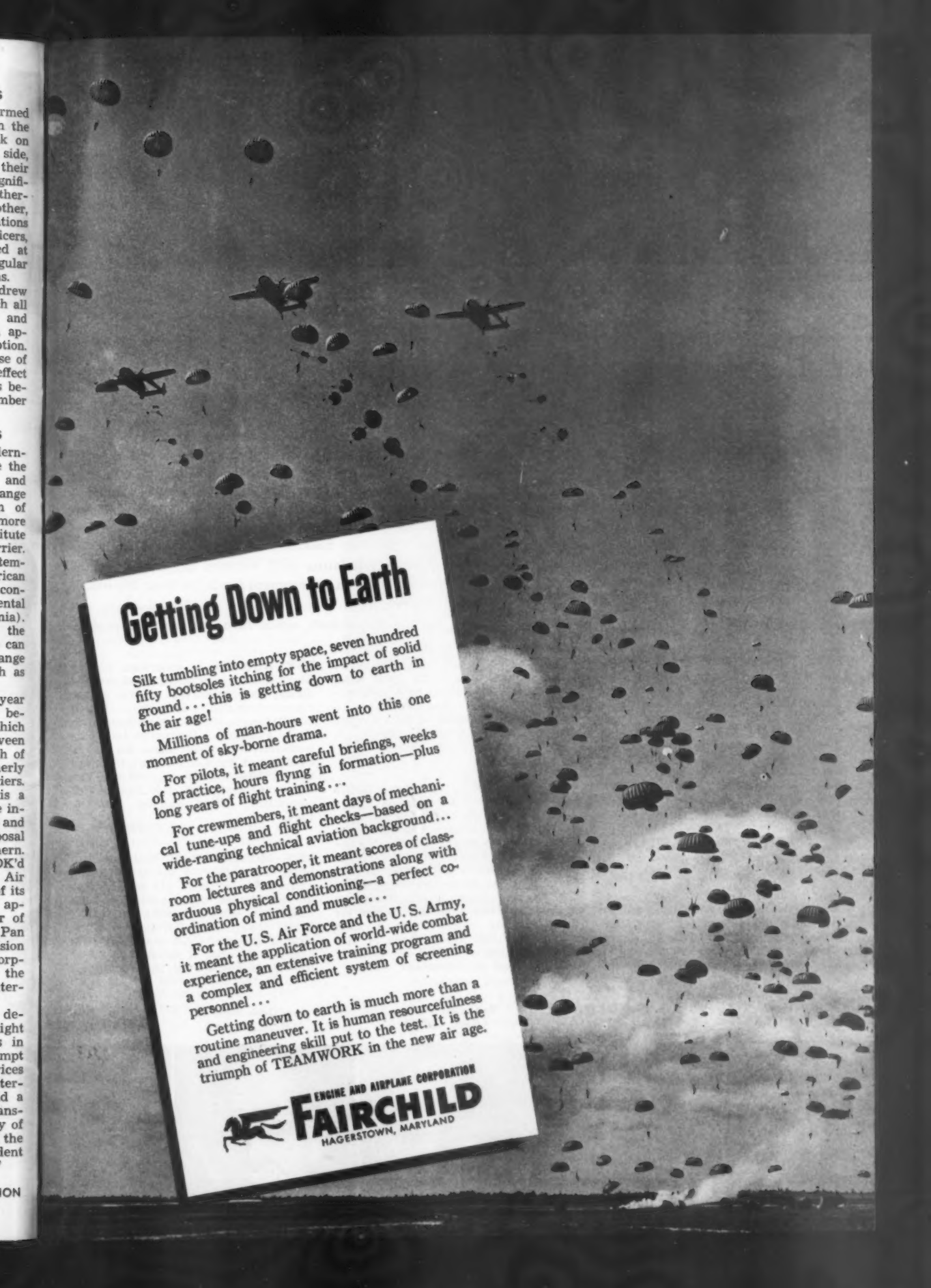
Interchanges & Mergers

Not the least important of modern-time economic developments are the CAB-encouraged interchange and merger proposals. The interchange of equipment permits rendition of one-plane service by two or more lines and, in effect, is a substitute for certification of a through carrier. Best example last year, was the temporary approval granted American and Delta to operate the highly controversial southern transcontinental route (Florida - Texas - California). The authority is to last until the Board decides whether the route can best be operated on the interchange basis or by a single carrier such as Eastern, the leading applicant.

Also approved by CAB last year was an interchange arrangement between Capital and National which permits one-plane service between designated points north and south of Washington, a service which formerly required the use of two carriers. Pending approval at this time is a U. S.-Latin American interchange involving National, Pan American, and Panagra, and an east-west proposal of Delta and Chicago and Southern.

In the merger field, CAB has OK'd the absorption of Challenger Air Lines by Monarch Airlines. One of its examiners has recommended approval of the momentous merger of American Overseas Airlines and Pan American. And, a favorable decision is expected on the proposed absorption of Arizona Airways by the merged Challenger-Monarch interests.

Undiscussed here, but certainly deserving to be classified as highlight material were the developments in the mail rate field, the first attempt of CAB to regulate charter services of the scheduled lines, the international traffic developments, and a score of others which made transportation history and caused many of the leading newspapers to refer to the government's smallest independent agency as—"the powerful CAB."


Getting Down to Earth
Silk tumbling into empty space, seven hundred fifty bootsoles itching for the impact of solid ground . . . this is getting down to earth in the air age!
Millions of man-hours went into this one moment of sky-borne drama.
For pilots, it meant careful briefings, weeks of practice, hours flying in formation—plus long years of flight training . . .
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For the U. S. Air Force and the U. S. Army, it meant the application of world-wide combat experience, an extensive training program and a complex and efficient system of screening personnel . . .
Getting down to earth is much more than a routine maneuver. It is human resourcefulness and engineering skill put to the test. It is the triumph of TEAMWORK in the new air age.
ENGINE AND AIRPLANE CORPORATION
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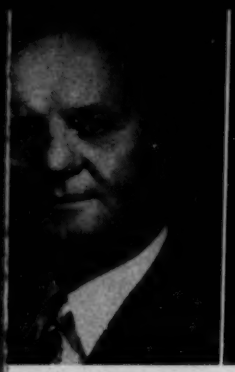


Rep. Carl Vinson (*Dem., Ga.*)

Sen. Edwin Johnson (*Dem., Colo.*)

Rep. George H. Mahon (*Dem., Texas*)

Rep. John J. Rooney (*Dem., N. Y.*)

Sen. Pat McCarran (*Dem., Nev.*)

CONGRESS

The Men Behind Air Policy

By GERARD B. DOBBEN

THE ECONOMIC well-being of the aviation industry depends in good measure on law-makers who shape national policy.

The 10 legislators appearing on this page have been selected for their importance to civil and military aviation based on their position, influence and knowledge of the subject. The selections were generally concurred in by many leaders in the industry both in and outside of the government.

Six of the ten chosen are Democrats, based somewhat on the realization that as members of the party in power they are in a better position to influence legislation than their Republican colleagues. Under a change in administration, this line-up would be changed. Appropriation committee members dominate the list because military aviation and the agencies regulating civil aviation are dependent in full measure on government funds for their life blood.

Here's why these members of Congress are important to aviation, either favorably or unfavorably.

REP. VINSON is chairman of the House Armed Services Committee which sponsored the 70-group Air Force bill. Once a big Navy man, Vinson is credited with having recognized early the new importance of air power and shifted his support accordingly. His position, knowledge of the subject and influence make him an outstanding leader in military aviation circles in the House. First elected to Congress November 3, 1914.

SEN. JOHNSON, as chairman of the Senate Interstate and Foreign Commerce Committee, is a comparatively new leader in Senate aviation affairs. He was a member of the Joint Congressional Aviation Policy Board, which served to whet his interest in aviation. When he became chairman of the commerce committee, he kept aviation under his own wing rather than delegate it to a subcommittee. All legislation pertaining to civil aviation is handled by his committee. First elected November 3, 1936.

REP. MAHON'S influence comes largely from his position as chairman of the Armed Services subcommittee of the House Appropriations Committee. A strong believer in the 70-group Air Force, Rep. Mahon has been a highly vocal critic of the President and Secretary of Defense for freezing funds which had been appropriated for building up the air arm. Mahon comes from a state which produces many types of aircraft, including the B-36 bomber. First elected in November, 1934.

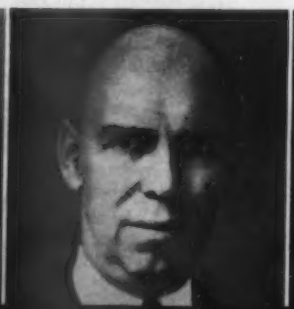
REP. ROONEY is chairman of the State, Justice, Commerce and the Judiciary subcommittee of the House Appropriations Committee which handles most of the funds allocated to civil aviation. Rooney's influence was felt this year when he led a fight to cut the CAB budget by more than $900,000 or nearly 22%. The cuts were sustained later by the full committee. First elected June 6, 1944.

SEN. McCARRAN is credited with being the father of the Civil Aeronautics Act of 1938. He is chairman of the Senate Appropriations subcommittee which handles the Commerce department appropriations, including those of CAA and CAB. He also is a member of the Armed Services subcommittee of the Appropri-

Rep. Carl Stefan (*Rep., Neb.*)

Rep. Paul J. Kilday (*Dem., Texas*)

Rep. Carl Hinshaw (*Rep., Calif.*)



Sen. Owen Brewster (*Rep., Maine*)

Rep. Albert J. (*Rep., Mich.*)

ations committee and was the author of several aviation bills which passed the Senate last year. First elected November, 1932.

REP. STEFAN, ranking Republican member of the State, Justice, Commerce and Judiciary subcommittee of the House Appropriations Committee, is the only member who represents civil aviation on the Central Committee of the Appropriations committee handling the omnibus fiscal 1951 appropriation bill. As a member of the Central Committee, he may be named to the conference committee with the Senate. He was a member of the Joint Congressional Aviation Policy Board. First elected November, 1934.

REP. KILDAY was in the forefront of the fight to establish the 70-group Air Force and has consistently lent his support to legislation and appropriations designed to keep this country in a position of leadership in the realm of air power. He was a member of the Joint Congressional Aviation Policy Board and is now a member of the Joint Committee on Atomic Energy. First elected November, 1938.

REP. HINSHAW is considered to be the best informed member of the House on both civil and military aviation. An engineer by profession, Rep. Hinshaw provides much technical knowledge for the benefit of the House Interstate and Foreign Commerce Committee of which he is second ranking Republican member. He was vice chairman of the Joint Congressional Aviation Policy Board and is a member of the Joint Committee on Atomic Energy. First elected November, 1938.

SEN. BREWSTER is one of the best informed members of the Senate in the field of commercial aviation and has devoted much time and travel to the problems of international aviation. Ranking Republican member of the Senate Interstate and Foreign Commerce Committee, Brewster served as chairman of the Joint Congressional Aviation Policy Board. He was chairman of the commerce committee in the 80th Congress. First elected to House, September 10, 1934, to the Senate, September, 1940.

REP. ENGEL is ranking Republican member of the Armed Services subcommittee of the House Appropriations Committee. While a supporter of a strong air arm from the earliest days of B-17 appropriations, Engel's influence has been felt particularly in his fight against waste and inefficiency and his support for adequate funds for research and development. First elected November, 1934.

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In 1927, the United States made its first bid international air transport: Pan American flew Cuba in a Fokker F-7 Clipper* (*below*). At this ti European airlines had already established extens international networks . . . and the United States h nothing to equal foreign-built or foreign-desig commercial aircraft for long-range flights.

Today, the situation is reversed. American airc of all types are in almost universal use throug the world, and United States airlines have earned position on international air routes. To help ma tain this leadership, Pan American recently int duced the world's largest and fastest airliner . . . double-decked Clipper (*right*), pioneered jointly Boeing and Pan American.

Free Enterprise *plus* Teamwork *have made America the leader in world air transport*

• Only 22 years ago, foreign airlines and foreign aircraft completely dominated international air transport. Today, America is undisputed world leader in both aircraft and international airlines.

A great new industry has forged to the front—one that promotes our prosperity in peace, that strengthens our hand in war.

This amazing growth came from *teamwork* . . . of our government, our aircraft makers, our airlines. Pan American is proud to have contributed—through pioneering the Atlantic and Pacific . . . in the use of radio, multiple flight crews, long-range weather forecastin . . . in introducing the double-decked airline the Dehmel flight simulator, the Sperry e gine analyzer and many other advances.

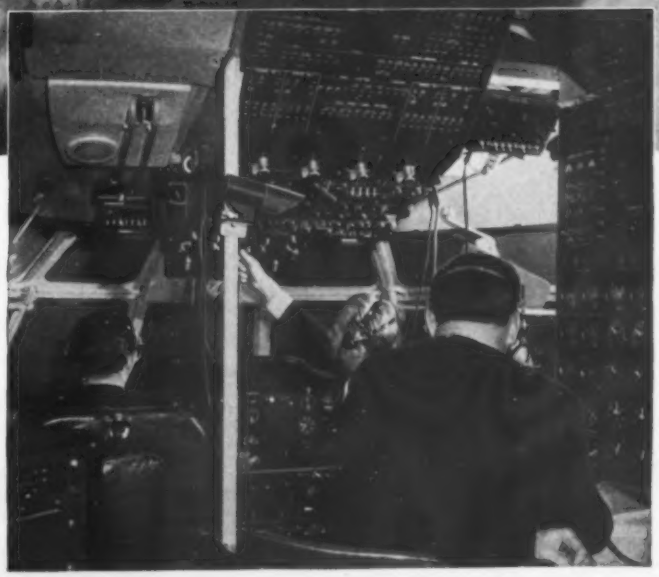
The work goes on: drawing boards foret an exciting future! The pioneering spirit is vigorous as ever throughout the entire U. industry. For this spirit flourishes best und the American tradition of free enterpri where neither manufacturers nor airlines a government-owned.

So long as this spirit prevails, America leadership is assured for years to come.

PAN AMERICAN

WORLD'S MOS

*Trade Mark, Reg. U. S. Pat. Off.



ehmel flight simulator is another example of United States leadership. Developed by Curtiss-Wright with Pan American, is used to train flight crews for the double-cked Clippers. The crew is trained together, a working team. Virtually every flight uation—*normal and emergency*—can be produced, even to the sound. Result: the ews are far better prepared than if they d trained entirely in flight. Pan American s offered the use of this device to other lines flying Boeing "Stratocruisers."

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The AVRO Jetliner — America's First Jet Transport

more passengers . . . fewer aircraft

In presenting the AVRO Jetliner for consideration by airline operators in the medium-range field AVRO Canada is sincerely aware of the responsibility it must assume in the introduction of this new and dynamic medium of *Jetflight*.

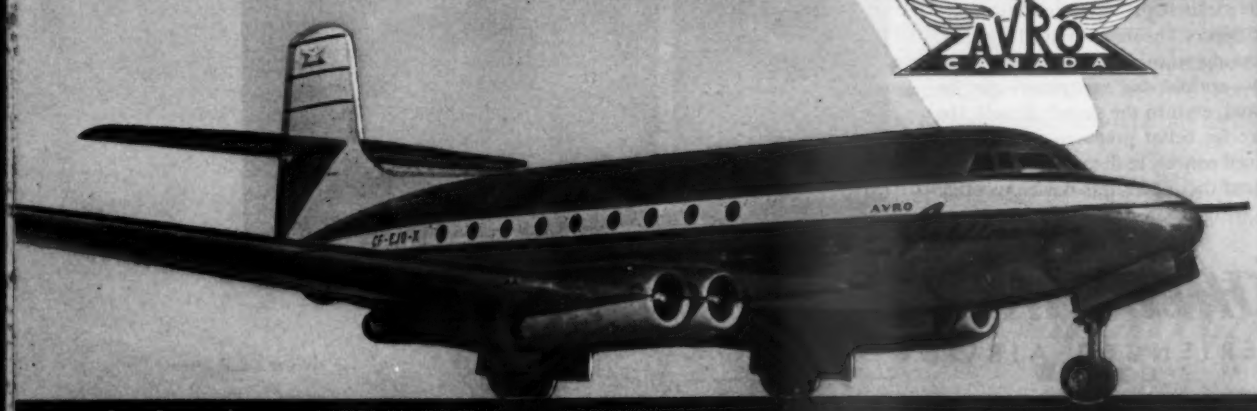
Facts and figures about the Jetliner's performance, carefully acquired during the past eight months, merit immediate attention by interested operators. They will be agreeably surprised about the economic advantages of the Jetliner. Their flying customers will be even more pleased with the quiet, restful, vibrationless comfort of Jetliner flight. Pilots, crews and maintenance personnel will find their duties and work simplified.

AVRO Canada is prepared to submit studies of Jetliner application which will show how its high cruising speed can improve schedules and influence the flying habits of this generation.

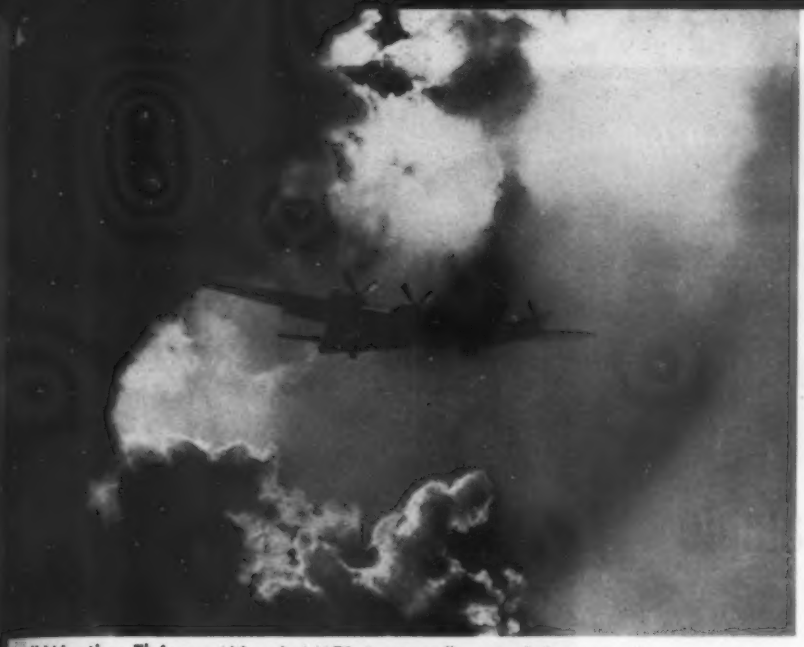
A. V. ROE CANADA LIMITED

MALTON, ONTARIO

AVRO CANADA



MEMBER OF THE HAWKER SIDDELEY GROUP



MATS

. . . all-purpose air arm

All-Weather Flying—Although MATS is generally regarded as an air transport organization, it has several other assigned functions. This photo of an Air Weather Service RB-29 on a weather reconnaissance flight illustrates one of them.

By JAMES J. HAGGERTY, JR.

BY THE time the Military Air Transport Service celebrates its second anniversary six weeks from now, its mission will have changed somewhat from the one assigned it on June 1, 1948, when MATS commenced operations.

The MATS mission, as then stated, was to provide air movement for military cargo and personnel, to be, in effect, a military airline. For the past several months, however, MATS has been gradually drifting away from that concept and soon (perhaps by the time this reaches print), the Department of Defense will issue a directive which will considerably alter MATS' status.

The effect of the directive will be, in the main, to de-emphasize MATS' airline status and to make the organization more of a military training command.

Under the new set-up, MATS will maintain its route structure as now constituted, and will fly transport missions over those routes, familiarizing crews with the various geographical areas in which they might have to fly should an emergency arise. But MATS' new basic mission will be the maintenance of an air transport structure ready for quick mobilization, rather than a military airline in being.

MATS now operates a fleet of 916 aircraft, spread over nine divisions. A joint operation, it includes three Navy transport squadrons as well as Air Force units. Headquarters is located at Andrews Air Force Base, Camp Springs, Md., about 20 miles from Washington, D. C.

MATS' boss is affable, quiet-mannered Maj. Gen. Laurence Sherman Kuter, 44, who came to the MATS post as commander from a tour of duty as United States representative to the International Civil Aviation Organization, with headquarters in Montreal. A combat veteran of both the European and Pacific Theaters in World War II, Kuter has been in military service since he was appointed a second lieutenant in the Field Artillery on June 14, 1927. He gained his air transport experience as commander of the Atlantic Division of the Air Transport Command in 1945.

Kuter's vice commander is a Naval officer, Brooklyn-born Rear Adm. John Perry Whitney, 49, one time deputy commander of Naval Air Transport Service. Whitney commanded the escort carrier Kitkun Bay during several Pacific campaigns, later took command of the heavy carrier Midway. He holds the Navy Cross, among other decorations.

Under the commander and vice commander are two main divisions: (1) Operations and (2) Services.

Present Deputy Commander for Operations is the well-known Maj. Gen. William H. Tunner, 43, who was commanding general of Air Transport Command's India-China Division

Air Rescue—Rescue work is another important MATS function. Here a Boeing SB-17 drops a life boat to a stranded crew.

Special Problems . . .
Strict Requirements call for

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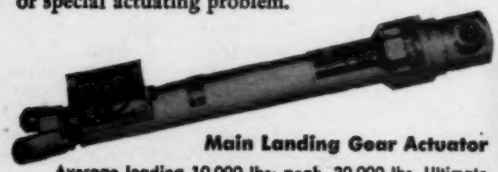
ACTUATORS & CONTROLS

the FAIRCHILD PACKET is an Outstanding Example

The U. S. Air Force wanted the C-119 Packet "workhorse" cargo plane to drop 20 500 lb. para-cans within 10 seconds. Fairchild solved the problem with an overhead monorail system operated by a Breeze rotary actuator.

Using a 2-stage planetary gear train and friction disc clutch, together with a quick-stop and locking brake, this Breeze actuator operates 32.5 ft. of cable on a 9 in. diameter drum at 3,500 lb. pull. Total actuator weight is only 75 lbs.

Nose wheel and main landing gear of the Packet are also Breeze-actuated. Consult Breeze engineers on any standard or special actuating problem.



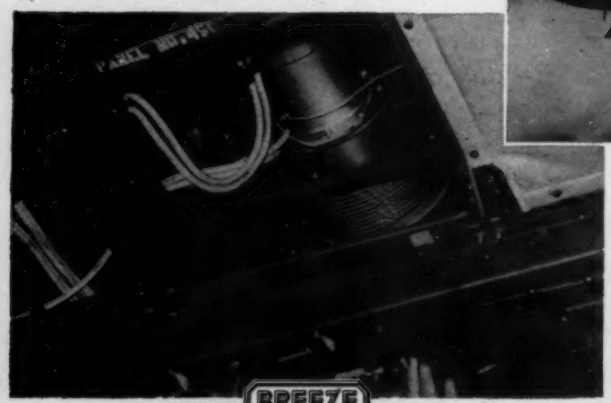
Main Landing Gear Actuator

Average loading 10,000 lbs; peak, 20,000 lbs. Ultimate static load, 45,000 lbs. Retraction time, approximately 7 seconds . . . total weight, including geared motor and hand-crank box, only 80 lbs.

Breeze screw-jack actuator retracts the gear in 7 seconds.

The Packet carries 42 paratroopers plus 10,000 lb. supplies with 2,000 mi. range.

Paratainer monorail actuator develops 1,300 lb. ft. torque from 24 volt D. C. motor.



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"Aero-Seal" Worm-drive Hose Clamps. Vibration proof, uniform clamping, use again and again. Cadmium plated or stainless steel.

MATS 'Big Four': Maj. Gen. Kutor, Rear Adm. Whitney, Maj. Gen. Haynes, and Maj. Gen. Tunner.

during the famed war-time "Hump" operation and who later commanded Operation Vittles, the air-lift to Berlin.

Deputy Commander for Services is Maj. Gen. Caleb V. Haynes, 55, one-time commander of the Assam-Burma-China Ferry Command, the organization which carried out the aerial evacuation of Burma during the last war. Haynes was promoted to Deputy Commander after having served two months as inspector general of MATS.

Three Transport Units

Air transport operations are divided into three divisions under the Deputy Commander, Operations: (1) the Atlantic Division, with headquarters at Westover AFB, Mass.; (2) the Continental Division, with headquarters at Kelly AFB, Tex.; and (3) the Pacific Division, with headquarters at Hickam AFB, Honolulu, Calif.

It is the responsibility of these divisions to "provide air transport for all branches of the Department of Defense, including feeder and trunk line services, medical air evacuation, special transport missions (and) strategic air lift."

Under the Deputy Commander, Services, there are six support organizations: the Airways and Air Communications Service, which provides a world-wide communications network; Air Weather Service, which provides weather data for Air Force operations; Air Rescue Service, which handles rescue support for the USAF; Flight Service, which provides flight advisory data; the Newfoundland Base Command and the Dhahran Command.

Navy participation in MATS consists of three transport squadrons, one assigned to each of the three transport divisions, and headquarters personnel. The Navy units are VR-6 at Westover AFB (Atlantic Division); VR-3 at Moffett Field, Calif. (Continental Division); and VR-8 at Hickam AFB (Pacific Division).

The Navy retains title and heavy maintenance responsibility for all aircraft assigned to MATS, and also decides the extent of its participation. Similarly, the Navy decides the number of personnel to be assigned to MATS and makes its own assignments. The Navy transport squadrons, however, are under MATS administrative control.

MATS now has about 49,400 military personnel, of whom some 3,000 are Navy, broken down as follows: Air transport, 20,000 (2,950 Navy); Airways and Air Communications Service, 14,000; Air Weather Service, 8,700; Air Rescue Service, 3,000; Newfoundland Base Command, 2,250; MATS headquarters, 700 (about 50 Navy); Flight Service, 500; and Dhahran Command, 250. In addition, MATS employs slightly more than 8,000 civilians.

The MATS air transport network covers some 65,000 route miles over four continents (see route charts), with flights of varying frequency over these routes.

During the calendar year 1949, MATS flew a total of 550,473,248 passenger miles and 89,364,633 cargo ton miles; average load factor was 79%. Despite these impressive figures, MATS officials emphasize that they are not in the airline business, but are concerned for the most part with keeping vital routes open for emergency mobilization. MATS does not carry revenue traffic over routes where the Civil Aeronautics Board has certified that adequate commercial service exists.

MATS Aircraft

Type	Number Assigned
Douglas C-47 (inc. Navy R4D)	246
Douglas C-54 (inc. Navy R5D)	240
Boeing SB-17	90
Boeing RB-29	64
Sikorsky H-5 (helicopter)	50
Stinson L-5	33
Beech C-45	33
Convair SA-10 (Catalina)	30
Fairchild C-82	26
North American B-25	23
Consolidated L-13	20
Lockheed C-121	10
Douglas C-74	10
Curtiss C-46	8
Boeing C-97 (3 YC-97, 3 C-97A, 1 C-97B)	7
North American T-6	6
Sikorsky H-6 (helicopter)	6
Grumman SA-16A	6
Douglas B-26	5
Douglas C-118 (DC-6)	1
Beech T-11	1
Piper L-4	1
TOTAL	916

High on Safety

MATS' safety record is an extremely impressive one. In its almost two years of operation, the organization has never had a fatal accident in scheduled operation. There was one fatal accident in 1948 on an unscheduled operation.

On scheduled operations, MATS had a rate of two accidents classed as "major" (non-fatal) per 100,000 flight hours in 1948, and four per 100,000 flight hours in 1949. (Actually, the scheduled operation safety record goes back further than MATS' organization date; if the Air Transport Command, its predecessor, is considered, there has been no fatal accident on scheduled operations since the beginning of 1947.)

Ordinary maintenance for the MATS fleet is handled by the air transport divisions at either Westover, Kelly or Hickam Air Force Bases. Cycle reconditioning or 1,000-hour progressive overhaul, however, is handled by civilian contractors.

At present, three contractors are handling the cycle reconditioning of the MATS C-54 fleet: Texas Engineering and Manufacturing Co. at Dallas, Tex.; Transocean Airlines at Oakland, Calif.; and Lockheed Aircraft Service, Inc., at Burbank, Calif.,

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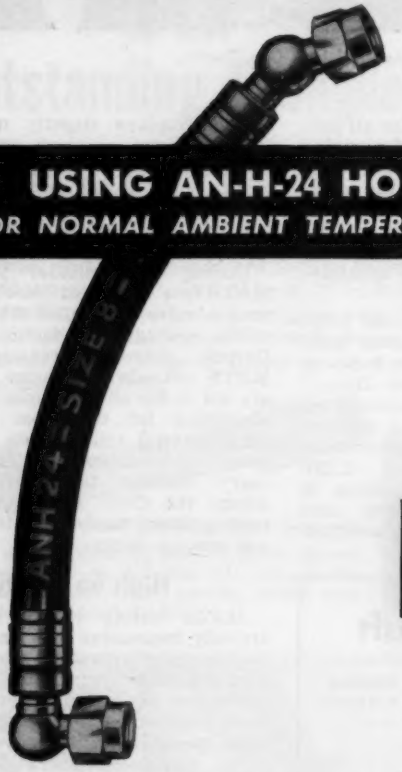
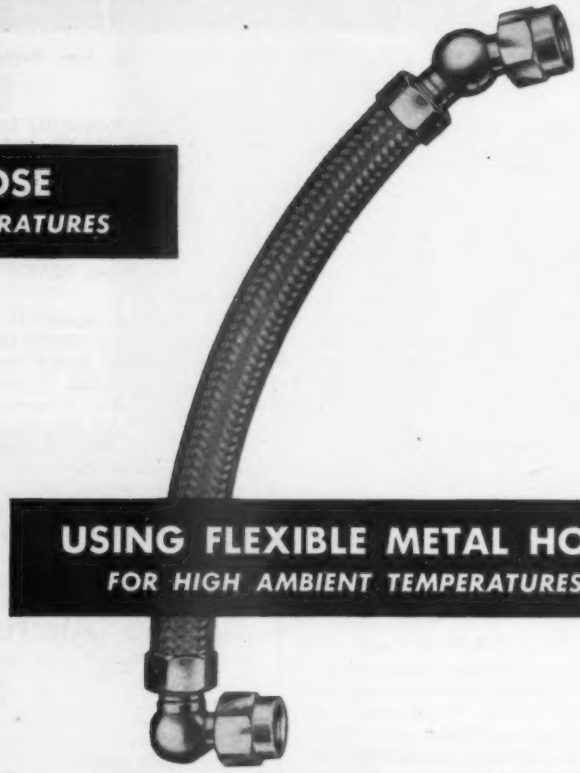


USING AN-H-24 HOSE
FOR NORMAL AMBIENT TEMPERATURES



USING FLEXIBLE METAL HOSE
FOR HIGH AMBIENT TEMPERATURES

AVICA Flexible Pipes using AN-H-24 1-wire hose; AN-H-28A 2-wire hose; or wire braid reinforced flexible metal hose can be supplied with AVICA Integral Couplings (patents applied for) in 6 angles from 90° to 165° inclusive, by 15 degree increments.

AVICA Flexible Metal Pipes withstand high ambient temperatures and are adaptable to all high, medium, and low pressure systems. They are suitable for jet engine fuel systems, fuel transfer lines and drain lines between the burner cans where high temperatures may be encountered.

AVICA Flexible Metal After-Burner fuel pipes are available with integral *angle* or straight couplings as required for re-heat installations.

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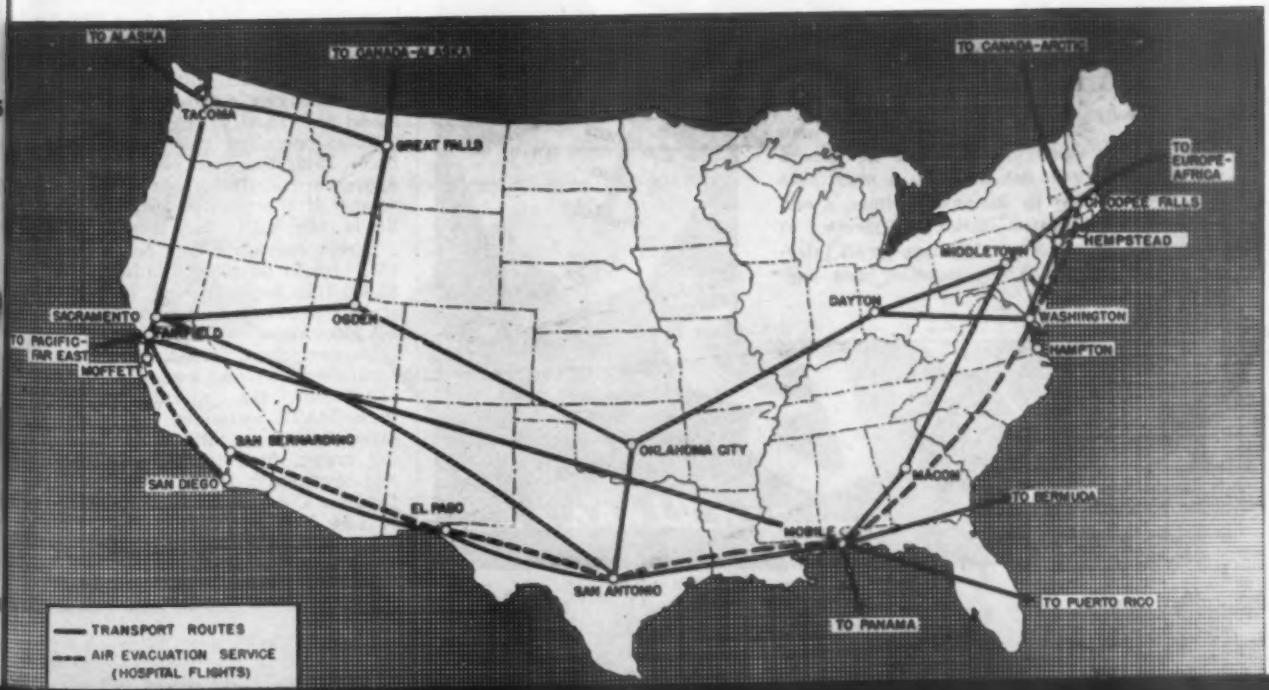
MATS Global Air Network



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A separate maintenance base has been set up at Brookley AFB, Mobile, Ala., for the giant Douglas C-74's. The 1,000-hour maintenance for the Navy Douglas R5D's (C-54's) is performed at the Naval Air Station, Moffett Field, Calif., by Navy personnel.

Since MATS has always been regarded as an air transport organization, the contributions of the support services receive very little attention, but they are nevertheless important adjuncts of the overall operation of the Air Force.

Airways and Air Communications Service, for instance, handled 19,115,000 control tower contacts, 3,419,258 ground/air contacts and 244,308 instrument approaches last year. Air Weather Service, which maintains about 200 weather units scattered strategically throughout the northern hemisphere, flew about 14,000 nautical miles of scheduled synoptic weather reconnaissance flights daily last year.

MATS now operates 22 different aircraft types (see chart), ranging from the tiny Piper L-4 Grasshopper to the super-size Douglas C-74. By far the majority of these planes are World War II types. MATS, the orphan cousin of priority units like the Strategic Air Command and the Tactical Air Command, is often overlooked when the top Air Force procurement officials are doling out the money for new aircraft. As a result, the war-time Douglas C-54 is still the standard four-engine transport and apparently will be for some time.

MATS Operating Costs

Scheduled and Non-Scheduled Transport Operations by Airplane Type

(Fiscal Year 1949)

Type	Cost Per Transport Mile	Cost Per Cargo Ton Mile Utilized	Cost Per Cargo Ton Mile Generated
Douglas C-47	$1.1823	$.8545	$.5118
Douglas C-54	2.0375	.5323	.3983
Douglas C-74	3.8157	.2890	.2490
Boeing YC-97	4.3951	.7239	.6739
Lockheed C-121 ..	2.2102	.4833	.4303

New Equipment

There has, though, been a trickle of new equipment into MATS. Air Rescue Service has already received six Grumman SA-16 Albatross amphibians and is slated to get more; ARS is also scheduled to get the new Piasecki H-21 helicopter, specially designed for Arctic rescue work.

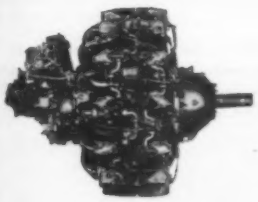
MATS has received seven Boeing C-97's (military version of the Stratocruiser), but three of them are the old YC-97 type, the earliest model. However, 37 new C-97A's are scheduled for delivery this year. MATS has also received 10 Lockheed C-121 Constellations. But the new Douglas C-124's, heavy equipment transports, will apparently not go to MATS; the current program calls for dividing them between Strategic Air Command and Tactical Air Command.

Total operating cost for MATS in fiscal 1949, the last year for which figures are available, was $82,527,051 (some of the cost of the Berlin air lift is reflected in that total).

Direct operating cost was $43,476,464, broken down as follows: crews, $5,625,477; fuel and oil, $10,526,097; traffic, $3,844,472; maintenance, $11,644,310; major overhaul, $11,836,108.

Support costs, including base costs, administration and overhead, totaled $39,050,587. By individual airplane type, MATS estimates the following direct hourly operating costs (including crews, fuel, traffic, maintenance and overhaul): Douglas C-47, $83.15; Douglas C-54, $189.98; Douglas C-74, $371.54; Boeing YC-97, $483.27; Lockheed C-121, $264.69. (For other operating costs, see chart.)

RESCUE ANGELS LIKE THIS COAST GUARD CATALINA PROTECT THE AIRLANES OF MANY NATIONS



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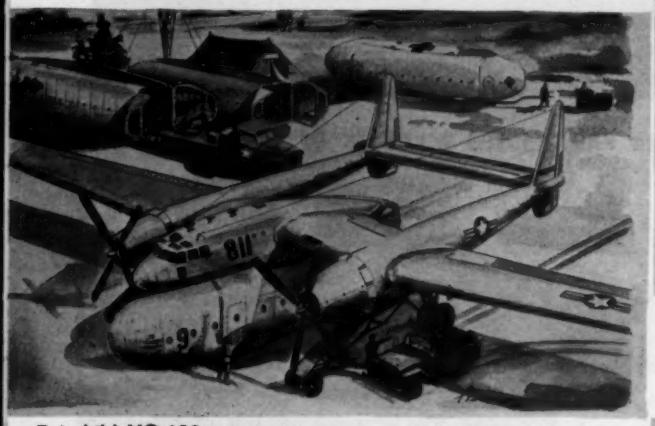
Military air transports . .

THE TWO military air services operate between them about two dozen different types of transport aircraft for various purposes—troop carrying, personnel transportation, air freight work, utility cargo, assault operations, etc. Standbys of the military air fleet are still the World War II cargo types, but a number of postwar models are in limited service and still others have been placed in production for later use. Shown on these pages is a cross-section of the military fleet, new types and old, experimental and production.

Fairchild C-119— This is the successor to the famed C-82 Packet, or "Flying Boxcar." The Air Force has ordered close to 200 C-119's so far, and about 50 of them are already in service.

Lockheed R6O Constitution— Navy's contribution to postwar military transport development. A very promising type, but lack of funds prevented its full development. Two built, no further production scheduled.



Fairchild XC-120— Built along the lines of the C-82 and C-119 Packets, the XC-120, has a detachable fuselage for rapid loading and unloading. Only one experimental model has been ordered to date.

Chase YC-122— Competitor to the YC-125 for the assault transport business, the YC-122 evolved from a glider design. Air Force has ordered two, Army Field Forces nine.

Chase XC-123— A larger assault transport, also evolved from a glider design. Only one built so far; it was involved in an accident recently but will be flying again soon.

Northrop YC-125— Designed for landing and taking off in ordinarily inaccessible areas, the YC-125 is a troop-carrying assault transport. Northrop is building 23 under present contracts. →

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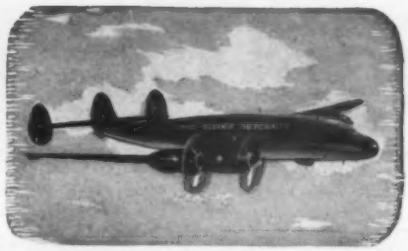
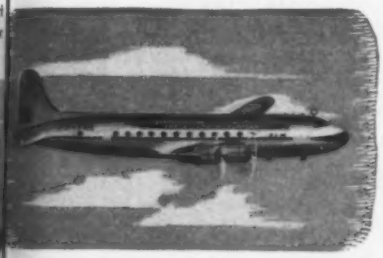
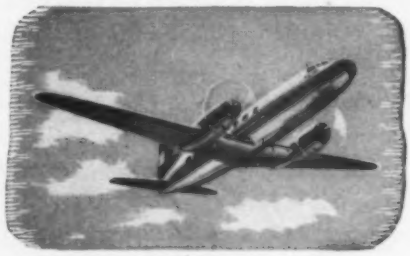
DC-6's — Fly Royal Routes from Europe to South Africa and South America.



CONSTELLATIONS — Fly the Royal Route from New York to Europe, the Middle and Far East; Miami to the Caribbean.



DC-4's — Fly Royal Routes in the Caribbean and between the principal cities of Europe.



CONVAIRS — Fly Royal Routes between the principal cities of Europe.

FOUNDED in 1919, KLM Royal Dutch Airlines started its service the next May when two leather-clad passengers crowded into the uncomfortable seats of a De Havilland plane for three hours of chilly cross-channel flying from Amsterdam to London. Then came the closed-cabin plane and such pioneering as KLM's historic flight from Amsterdam to Batavia in 1924. Today, KLM flies the world's most modern planes between the great cities of five continents. Follow KLM's growth, from humble beginning to present prominence, and you trace the development of commercial aviation, itself.

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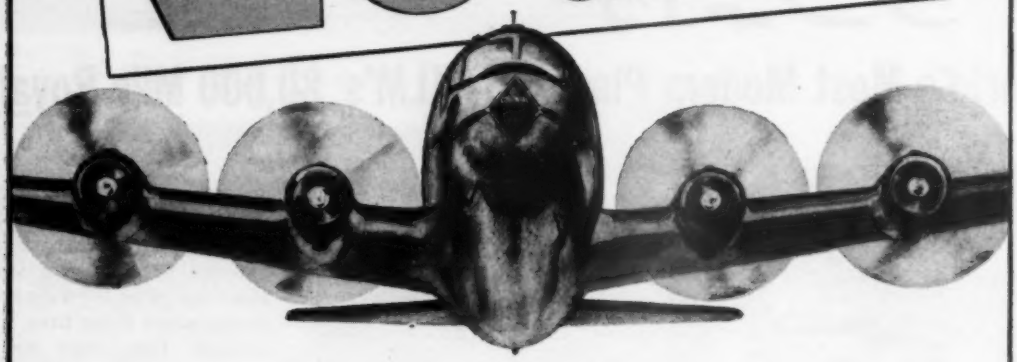

"On April 18th, Colonial Airlines completed 20 consecutive years of safety without fatal accident or serious injury to a single passenger or crew member. During this period, we flew a total of 310,000,000 passenger miles, and approximately 455,000 landings and take-offs were accomplished.

"This unequalled record could not have been attained without the cooperation and strict adherence to Company regulations of each employee of Colonial Airlines. Every member of Colonial's family is entitled to feel proud of this record.

"This record has been achieved while giving the flying public the finest in service and the ultimate in safety. We shall continue to do everything in our power to maintain this record.

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Sigmund Janas
President

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. . . a plane for every task

Douglas C-124— The Air Force's largest production transport. The first units are now rolling off the production line; 65 on order.

Douglas C-47— The old work horse of military air transport. Over 10,000 were built during the war years. Still in use by both services, about 1,400 in USAF and 250 in Navy.

Douglas C-54— Military version of the DC-4, over 1,000 of which were built for military use during the war. Still the standard four-engine transport with about 400 in service.

uglas C-74— The giant Globemaster. The Air Force now has n service; a 12th airplane was modified as the prototype of the Douglas C-124 heavy equipment transport.

Boeing C-97— Military version of the Stratocruiser The Air Force has 50 on order and deliveries are just getting into high gear. About a dozen now in service.

kheed C-121— Military version of the Constellation. The Air e has 10 in service. The Navy also has two Constellations, known as PO-1W's, for aerial early warning use.

Consolidated Vultee XC-99— Sister ship of the B-36 bomber, t XC-99 could carry 400 troops. Only one built, no further productic scheduled at the moment.

Engineering

Engineering an airplane propeller installation is one of the most complex tasks in the aviation industry. It's an art that calls for smooth integration of aerodynamic, metallurgical, hydraulic, electronic and vibratory techniques — plus the ability to anticipate and plan for tomorrow's needs.

A typical problem tackled by Hamilton Standard's engineering team is the propeller installation for a new passenger liner. Our design engineers must come up with a sturdy, reliable propeller that will have high performance and comparatively low weight, and it must meet all specifications laid down by the airplane manufacturer.

It sounds easy, but that's only the beginning. This propeller installation probably would call for constant speed, effective internal de-icing, quick feathering to prevent vibration and drag if engine trouble arises, an automatic device to synchronize all propellers of a multi-engine plane for smooth and comfortable flight, and fast, reliable reversing for shorter, safer landings. In addition, it must handle, efficiently, higher take-off and higher cruising horsepowers than ever before.

We call that a normal assignment, but in meeting all requirements of such a job our engineering team carries a tremendous work load. One propeller type isn't suitable for all airplane-engine combinations. Each new-type plane requires a tailor-made propeller. That's why Hamilton Standard has hundreds of aluminum alloy and steel blade designs, plus scores of major propeller hub designs.

Anything so complicated demands engineering of a high order. Each new feature built into a propeller is the result of many years of engineering. For example, it took 5 years and 10 million dollars to develop fully the reversible, Hydromatic steel-bladed propeller.

Today, we are meeting a new challenge in aircraft propulsion — propellers to handle exceedingly high power outputs of new turbo-prop engines. With the aid and collaboration of the military services, we already have devoted large amounts of money and engineering time to exhaustive exploration in this new field. The first in a series of Hamilton Standard Turbo-Hydromatic propellers recently passed its AN type tests.

Facts and figures on some phases of the art of engineering a modern propeller installation appear on the opposite page.

a modern propeller

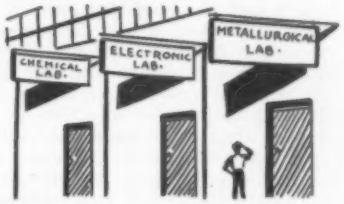
WHAT IS THE EFFICIENCY OF A MODERN AIRPLANE PROPELLER?

- ☐ 50 per cent?
- ☐ 75 per cent?
- ☐ 90 per cent?
- ☐ 100 per cent?

The efficiency of a modern propeller is high, ranging from 80% to as much as 90%, due in large measure to the vast background of engineering knowledge on which Hamilton Standard can draw. Our "strip analysis" method of calculating performance enables us to refine the efficiency of a propeller for any airplane-engine combination down to the last one percent. Recently, we improved the climb performance of a large, four-engine transport's propellers by 3% and made possible a certifiable increase of 1,400 pounds in the plane's gross weight. That meant greater payload and more efficient operation. Even increases in efficiency as small as 1% or 2% can improve plane payload from 10% to 50%.

WHAT TYPES OF LABORATORIES ARE USED BY HAMILTON STANDARD?

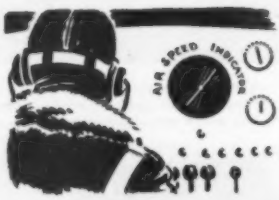
- ☐ Metallurgical?
- ☐ Electronic?
- ☐ Chemical?
- ☐ Rubber?



The list of facilities available to Hamilton Standard's engineering team includes metallurgical, electronic, chemical, rubber, vibration, instrumentation, pneumatic and accessory test laboratories among major aids in the art-science of engineering a modern propeller. In addition, there are numerous test cells, a cold room, a hot room and whirl rigs. Together, they represent a heavy investment in manpower, plant area and millions of dollars. But all are vitally necessary to members of our engineering staff, who pool their skills to give the world of aviation the design leadership for which Hamilton Standard propellers are known — wherever man flies.

PROPELLERS ARE EFFICIENT UP TO WHAT AIRPLANE SPEEDS?

- ☐ 200 miles an hour?
- ☐ 400 miles an hour?
- ☐ 600 miles an hour?
- ☐ 800 miles an hour?



Today's airliners cruise between 250 and 350 miles an hour. But Hamilton Standard is now designing propellers for dependable, efficient propulsion at twice those speeds. Our engineering research program pioneered investigation of propellers for aircraft operating at high subsonic speeds and was the first to obtain confirmation of the supersonic propeller concept. We actually have been running propellers on gas turbine power plants for over 5 years. The total test time in that field is now over 2,000 hours — more than any other propeller in the United States.

HAMILTON STANDARD

HAMILTON STANDARD
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DIVISION OF UNITED AIRCRAFT CORPORATION

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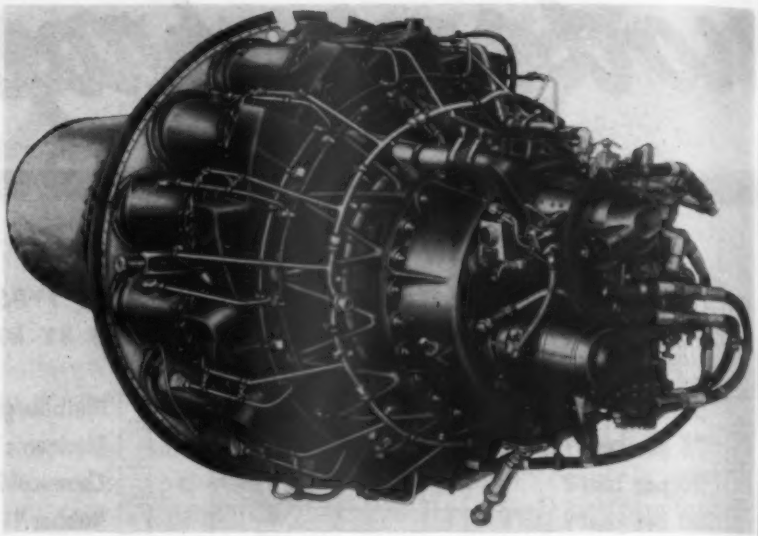
ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION

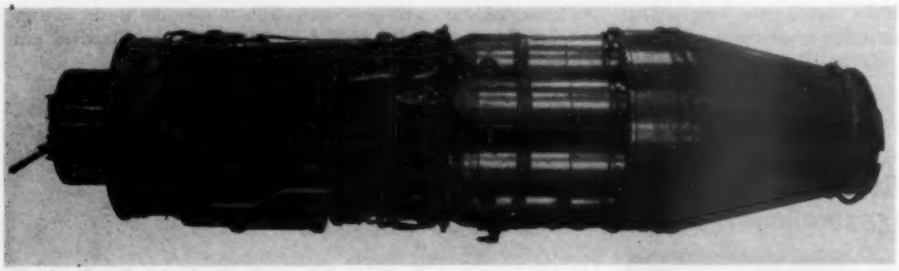
First Commercial Jet Engines

THE YEAR 1949 saw three turbine engines approved for commercial use by the Civil Aeronautics Administration. All three engines are turbo-jet engines, a fact emphasizing the higher rate of development of the turbo jet as compared to the turbo-prop engine in this country. The greater military interest in the turbo jet is responsible for this trend. Even in the field of military operations only one turbo-prop engine, the Allison T-40, has been officially announced. Still unannounced is a turbo-prop under development by Pratt and Whitney and expected to be released within the next two months.

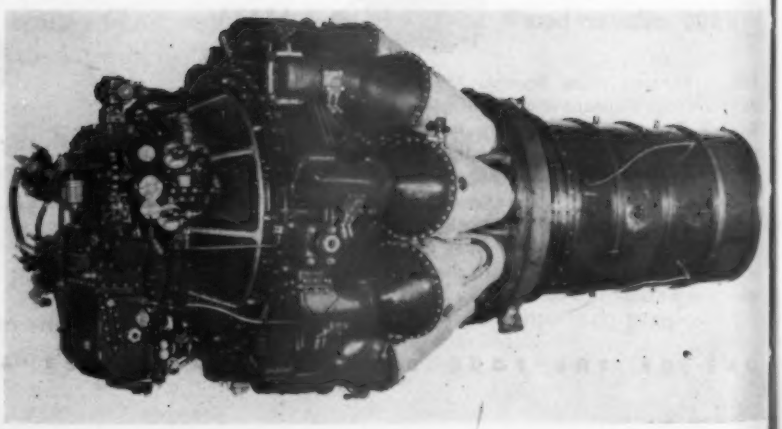
It should be noted that each of the engines listed here has the potential for much greater thrust. Figures shown are dry ratings since the military services have not permitted certification with water injection as yet. In addition to this additional thrust, readily available to the presently certificated engines, later models of each of these engines are now operating with military ratings ranging from approximately one to two thousand pounds additional static thrust.



Allison J-33— This is a centrifugal flow turbo-jet rated at 3825 pounds static thrust, dry. It uses 14 combustion chambers with straight through flow. A single-stage axial flow gas turbine is used to drive the compressors. Engine diameter is 50.5 inches, overall length (with tail cone) 103 inches dry weight is 1735 pounds. This was the first jet engine to be certificated for commercial use.



GE J-47— The J-47 is an axial flow turbo jet rated commercially at 5,000 pounds static thrust, dry. Military models of this engine have been rated over 6,000 pounds static thrust. The J-47 is the power unit in the North American F-86 which established the world's speed record of 670.981 mph in September of 1948. Diameter of the J-47 is 36¾ inches, length 144 inches, weight approximately 2500 pounds. It uses a 12 stage axial flow compressor and single stage turbine.



Pratt & Whitney J-42— The J-42 is a single-stage, centrifugal-flow turbo-jet, an American version of the British Rolls-Royce Nene. It is rated commercially at 5,000 pounds static thrust, dry. Engine weight is 1715 pounds. Diameter is 49.5 inches, length, 103.25 inches. Military version of the J-42 is rated at 5,000 pounds static thrust at sea level.

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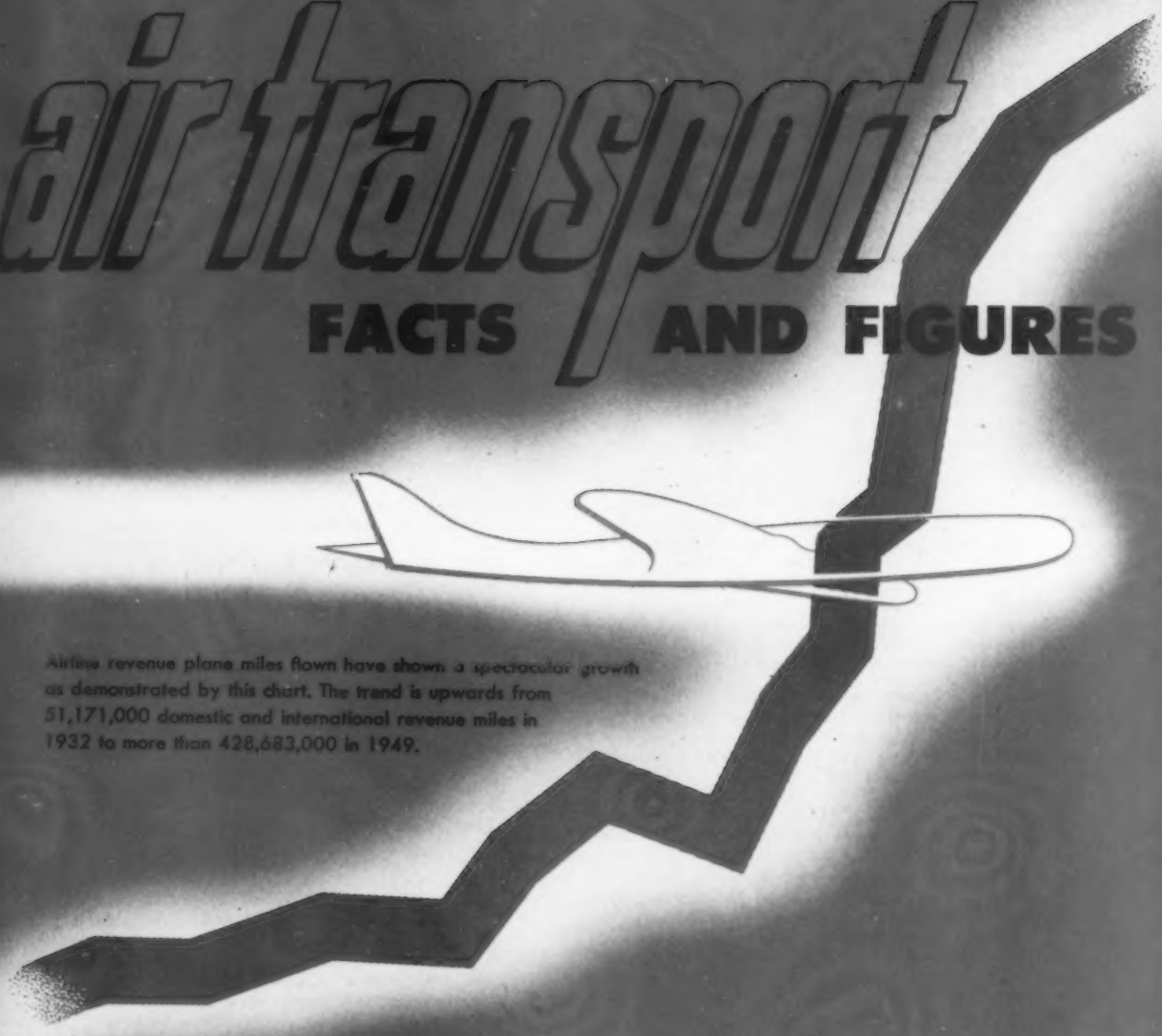
11th Edition

air transport FACTS AND FIGURES



Airline revenue plane miles flown have shown a spectacular growth as demonstrated by this chart. The trend is upwards from 51,171,000 domestic and international revenue miles in 1932 to more than 428,683,000 in 1949.

Operations of the Scheduled Airlines in 1949

COMMERCIAL air transportation in 1949 had the biggest year in its history despite the fact that other forms of transportation continued to show postwar declines.

The industry continued its financial recovery and estimates are that gross revenues will be about 13% above 1948 and net operating profit for the scheduled airlines will be well over forty million dollars for 1949.

The spectacular improvement in airline schedule dependability made in 1948 was continued in 1949. The safety record for the combined domestic and international carriers was the best in history and the domestic safety record equalled that of 1948.

Income from the mails assumed increasing importance in the revenues of the international and local service lines but decreased relatively in the domestic trunk lines. There was an increasing overall volume of mail and in some instances increases in the rates of compensation.

Of the total operating revenues of the domestic trunk airlines for 1949, passenger traffic contributed 81.99%; mail 10.08%; freight and express 5.86%, with excess baggage and other services accounting for 2.07%. In the international field passenger traffic contributed 58.94%; mail 23.90%; freight and express 8.46%; with excess baggage and other services accounting for 8.70%.

SAFETY: In 1949 the scheduled airlines of the United States, flying 16,424,134 passengers more than 8,842,805,000 passenger miles on air routes covering the U. S. and around the world, set a new safety record. The record for all scheduled U. S. airlines, operating overseas and domestically was 1.0 passenger fatalities per 100 million passenger miles. On the domestic routes alone the rate was 1.3 fatalities per 100 million passenger miles, while on the routes of the U. S. airlines operating abroad there were no passenger fatalities.

The domestic safety record for 1949 was the same as that for 1948, though U. S. lines carried in excess of two million more

INTERCITY PASSENGER MILES

By Common Carriers and Private Automobile—1940–1949
(Millions of Passenger Miles)

	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
STEAM RAILROADS:										
Pullman	7,293	9,166	17,852	24,675	26,943	26,912	19,838	12,260	11,014	9,350
16 Trunk Airlines	1,047	1,377	1,406	1,617	2,161	3,336	5,903	6,011	5,823	6,580
Pullman and Airlines combined	8,340	10,543	19,258	26,292	29,104	30,248	25,741	18,271	16,837	15,930
Airline % of this total	12.57%	13.06%	7.30%	6.15%	7.42%	11.02%	23.00%	32.90%	34.58%	41.31%
STEAM RAILROADS:										
Day Coach	12,480	16,106	30,910	57,907	63,287	59,415	39,002	27,665	24,315	20,100
INTER-CITY MOTOR BUS LINES	11,600	13,646	21,515	27,416	26,548	26,927	25,576	23,404	23,650	21,300
Total Railroad Coach and Inter-city Bus	24,080	29,752	52,425	85,323	89,835	86,342	64,578	51,069	47,965	41,400
Total Railroad, Airline, Bus Lines	32,420	40,295	71,683	111,615	118,939	116,590	90,319	69,836	64,802	57,330
Private Automobile Inter-city	245,622	264,316	199,635	147,131	151,251	179,837	253,570	274,008	287,420	301,500
Total Common and Private Carrier	278,042	304,611	271,318	258,746	270,190	296,427	343,889	343,348	352,222	358,830
Common Carrier % of Total	11.66%	13.20%	26.45%	43.09%	44.05%	39.33%	26.29%	20.30%	18.40%	15.98%
Passenger-miles per capita	2,106	2,290	2,020	1,931	2,039	2,245	2,451	2,417	2,432	2,485

passengers in 1949 and flew more than one billion more passenger-miles last year than during the year before.

In commenting on the spectacular safety record of the scheduled airlines, Civil Aeronautics Board Chairman Joseph J. O'Connell, Jr., pointed to the decrease in the number of fatal accidents, from 9 in 1946 to 4 in 1949. The four domestic accidents in 1949 occurred during a period in which scheduled domestic airlines were making approximately five million take-offs and landings, or one every eight seconds night and day.

For each passenger fatality on domestic scheduled airlines in 1949 there were 73,000,000 passenger miles flown, equal to nearly 3,000 trips around the earth at the equator.

TRAFFIC: In 1948 the domestic scheduled airlines carried 35.30% of the total first class travel market in the United States. In 1949 they carried 41.63% of this market.

The safety record and vastly improved regularity of service, resulted in the establishment of a new record for domestic air passenger transportation. In 1949, more than 6¾ billion passenger miles were flown, an increase of 13⅓% over the previous year.

The new table this year on "Intercity Passenger-Miles" shows that the airlines and the private automobile are the only forms of intercity transportation to show an increase in 1949.

In 1949, as in 1948, the most conspicuous change took place in the transport of commodities. The ton miles of express and freight for domestic trunk and international flag carriers are 180,637,184 as compared with 146,969,361 in the preceding year—a gain of 22.9%. Where domestic air freight is concerned alone, figures show 95,453,533 ton miles flown in 1949 against 71,283,727 in 1948, a gain of 33.9%.

AIR MAIL: The Post Office report for fiscal 1949 compared with fiscal 1948 shows an increase of almost 20 million dollars in payments to the domestic carriers and a rise of more than 25 million dollars to international carriers. On the routes of the larger domestic carriers the payment received for transporting airmail dropped 15¢ per ton mile for the entire year of 1949 as compared to 1948.

The system of air mail payments established by the CAB is on a sliding scale, so that in the case of the four largest airlines, the more mail they carry, the less they receive per ton mile. In the case of the other airlines, the more non-mail traffic they carry, the less they receive for transporting mail. Thus, the increased volume of business in 1949 made possible the reduction in the charge for transporting mail on the major trunk routes from $1.27½ in 1948 to $1.12½ in 1949 per ton mile.

FINANCIAL: The improved balance sheet of the airlines was due to continued efforts to increase passenger business while maintaining a level of fares which would continue the increase of gross receipts. Basic passenger rates remained the same, but a number of promotional discounts, such as family fares, special excursion fares, and the like, were instituted. Additional carriers established coach services, which were limited in their operation so as to provide for the maximum development of new business without detracting to any great extent from the normal passenger traffic that would travel at the regular fares. Passenger traffic in 1949 was carried on the average at a fare about 11/100 of a cent per mile less than the previous year. The result of all this was that passenger revenue increased by more than $45 million over 1948.

This passenger revenue gain was offset slightly by the reduction in express revenue, not only in gross, but also per ton mile carried. Ton mile receipts from express, reflecting express rates, have been reduced from about 38¢ in 1946 to 31½¢ in 1949.

Freight revenues for the domestic carriers have shown a spectacular increase since 1946. During the four-year period since the war, freight traffic has increased tremendously, but the return per unit of service has been dropping steadily. During 1949 the more than 95 million ton miles flown by the domestic airlines were carried at a rate of 19.25¢ per ton mile, resulting in more than $18 million in revenue.

As a result of all these efforts to increase non-mail revenues, the domestic airlines produced 42% more of such revenues in 1949 than they did in 1946—a gross increase of about $125 million.

OPERATIONAL EXPENSES: The problem of reducing expenses has occupied as much or more of the airlines' attention than has the increasing of revenues. These efforts were marked by drastic cuts all along the line, in previous activities and in personnel. The average number of employes on the payrolls of the 16 trunk lines in 1946 was 68,145. Following reductions in 1947 and 1948 there were additional reductions in 1949 to 56,815 employes. (We use the 16 trunk lines in this illustration because since 1946 more than 20 local service airlines have been brought into existence.) At the same time that the number of employes was being reduced, the productivity of airline employes was being increased. Revenue ton miles produced by each employee increased from 9,534 in 1946 to 14,115 in 1949—an increase of almost 50% in four years.

Expense reductions were aided by the introduction of new and improved flying equipment during these years. While expenses were sharply increased during the transition period from one type of equipment to another, the industry during 1949 began to receive some of the benefits from the increased efficiency of these new airplanes. As a result of all of their efforts to reduce expenses while prices of materials and supplies were increasing sharply, and wages and salaries were doing likewise, the airlines were successful in holding their expenses in check and providing a very substantial reduction in 1949.

The rapid expansion of the industry, and the changes in equipment, were reflected in operating expense increases for the 16 domestic trunk lines from 48.8¢ per revenue ton mile in 1946 to 54.2¢ per ton mile in 1947 and 58.2¢ per ton mile in 1948. The trend was checked at that point, and expenses per ton mile were reduced in 1949 to 53.74¢.

The increases in revenue and reductions in expense resulted in the 16 trunk airlines making a small operating profit in 1948 of about $2 million and another profit of about $25 million in

1949. These figures are, of course, before interest and taxes. There is no present indication of the extent to which taxes and fixed charges will reduce the operating profit for 1949.

INTERNATIONAL OPERATIONS: The international carriers had special difficulties of their own. During the chaotic conditions which followed the war, they built an international air transport system far more extensive than had been contemplated prior to the war. They increased their route miles operated from about 39,000 in 1945 to nearly 210,000 in 1949. They increased the number of airplanes on the line from 97 in 1946 to 219 in 1949, plus the part-time use of an additional 304 airplanes employed in both domestic and international service. Revenue passenger miles increased from 1,100,741,000 in 1946 to 2,072,749,000 in 1949.

The international carriers increased their non-U. S. mail revenues from $121,693,000 in 1946 to about $215,647,000 in 1949. They, like the domestic carriers, have managed to keep their expenses in check as a result particularly of the use of more efficient aircraft and a sharp reduction in employes. In 1947 they had about 27,000 employes. This figure was reduced to about 18,000 in 1949. During this same period they increased the productivity of employes from 6,600 revenue ton miles per employee in 1946 to 17,000 in 1949—an increase of almost 160%. The expenses per revenue ton mile in international service were 86.18¢ in 1948, and were reduced to 85¢ in 1949.

The international carriers show a profit for 1949 in the neighborhood of $20 million before taxes and interest. Here again the profits earned by these carriers should not inspire any complacency on the part of those who have any responsibility for the continued soundness of the industry. Foreign competition is severe, and the percentage of total traffic hauled by American-flag carriers is dropping slightly and general world conditions do not provide a perfect atmosphere in which to develop.

LOCAL SERVICE: Another segment of the industry facing special problems comprises local service operation. Almost all of these airlines have been organized since the war ended, and were established as an experimental service to small communities. The characteristics of these carriers cannot be judged by the standards of the other airlines in the industry by reason of their recent establishment, and because they are designed to serve a somewhat different purpose, i.e., service to small communities where traffic may not generate substantial loads, at least at present.

While the trunk lines have been operating at about a 60% load factor, the local service lines, operating DC-3's for the most part, have generally not exceeded 30%. Mail compensation per airplane mile or per ton mile has run relatively high because of the thin traffic over these routes. However, managements of these airlines are making every effort to develop new means of reducing expenses and increasing revenues. The efforts of the managements generally are directed toward the speedy reduction of their reliance upon government support.

MILITARY CONTRACT: In 1949 the airlines, after years of effort, signed the first Joint Military Air Transportation Agreement with the Armed Forces. For over 30 years the railroads have granted a discount for military traffic. In return they have been given a virtual monopoly of all military traffic which they could handle satisfactorily. The airlines have been protesting this preferential agreement between the military agencies and the railroads for a number of years.

In late 1946, as a result of the airlines' protests, they were invited to bid for a contract with the military agencies for the handling of military traffic during the fiscal year 1948. The conditions of the invitation were obviously adapted to surface transportation only, so that it was quite impracticable for the airlines to comply with them. This resulted in the airlines' advising the military agencies that they could not submit a bid on such conditions, and again protesting the entire agreement.

In 1949 bids were invited for the fiscal year 1950. At this time, the airlines were able to submit a bid, but conditioned their bid upon the elimination of any preference for any form of transportation. The bus carriers attached a similar condition to their bid. However, the railroads conditioned their bid upon a continuation of their preference clause.

Consideration of these bids apparently resulted in a number of differences of opinion, resulting in the matter being dragged on until the very beginning of the new fiscal year, with no decision announced as to which of the bids would be accepted.

When the new fiscal year was about to open, representatives of the military departments approached the airlines with a "compromise" counterproposal. They indicated that the military departments could not, without further study and consideration, cut off the longstanding railroad preference, but would have to continue it for at least one more year. They stated, however, that if the airlines would grant a 10% discount for military traffic, the military agencies in return, would undertake to do two things: First, they would modify their regulations so that they would more accurately reflect the terms of the contracts; and second, they would have the Munitions Board conduct a comprehensive study of the transportation requirements of the military agencies, which would serve as a basis for a complete reconsideration of the agencies' policies in routing military traffic over common carriers.

The airlines were not inclined to regard this as much of a "compromise." It was, in effect, a complete acceptance of the railroad bid and a rejection of the most important condition in the airline bid; namely, the elimination of the railroad preference. The airlines were led to believe, however, that the revision of the regulations would have the practical effect of routing a larger amount of the military business over the air carriers and, at the same time, were hopeful that the study which was to be undertaken by the Munitions Board would result in an early revision in the transportation policies of the military agencies which would ultimately redound to the benefit of the airlines.

Accordingly, it was decided to accept the "compromise" offered by the military departments.

The results to date of this new policy, in terms of additional revenues, can be described as negligible. On the basis of our experience to date, the deficiencies in the policy itself—notably the preservation of the railroad preference, plus its reception by many people who administer it—have combined to render it largely ineffectual in producing a redistribution in military traffic. In fact, the airlines cannot regard it as adequate consideration for the discount which they have provided.

This military traffic should be handled on an open, free and competitive basis, using the mode of transportation best adapted to the needs of any particular move with full regard for economy and efficiency.

PREDICTIONS: All present economic indicators point to the conclusion that the year 1950 will be a year of sustained business activity, and sustained national and individual incomes maintained at levels no lower than 1949 and possibly a little higher. This factor should be reflected in the national travel market in such fashion that the airline passenger-miles of 1950 should moderately exceed those of 1949. Both the domestic and the overseas airlines should participate in this increase in passenger traffic. The rate of increase for 1950 is expected to be lower than that in 1949; but after the stable level of domestic airline passenger traffic in 1946-7-8, the strength of the factors that enabled the domestic lines in 1949 to rise 14% above 1948, is not likely to be dissipated in a single year.

With respect to mail, express, and freight, a somewhat different conclusion emerges. Small gains in domestic mail ton miles are the prospect for the airborne mail. Air express, which sustained a distinct loss in 1948, due presumably to the inauguration of air parcel post in September 1948, appears to have staged something of a comeback in the last half of 1949; and it appears probable that this trend will continue in 1950. Accordingly, air express in 1950 should be somewhat higher than 1949, but lower than 1948. Air freight will continue to increase, but at a lower level than in 1949.

E. S. LAND, *President*
Air Transport Association of America

ABOUT THE AUTHOR

Emory Scott Land, Vice Admiral, U.S.N. (Retired), is president of the Air Transport Association of America. He served in the Navy, from his graduation from Annapolis in 1902, until 1937, when he became a member of the U.S. Maritime Commission. He was designated Chairman of the Commission in 1938 and also served as War Shipping Administrator during World War II.

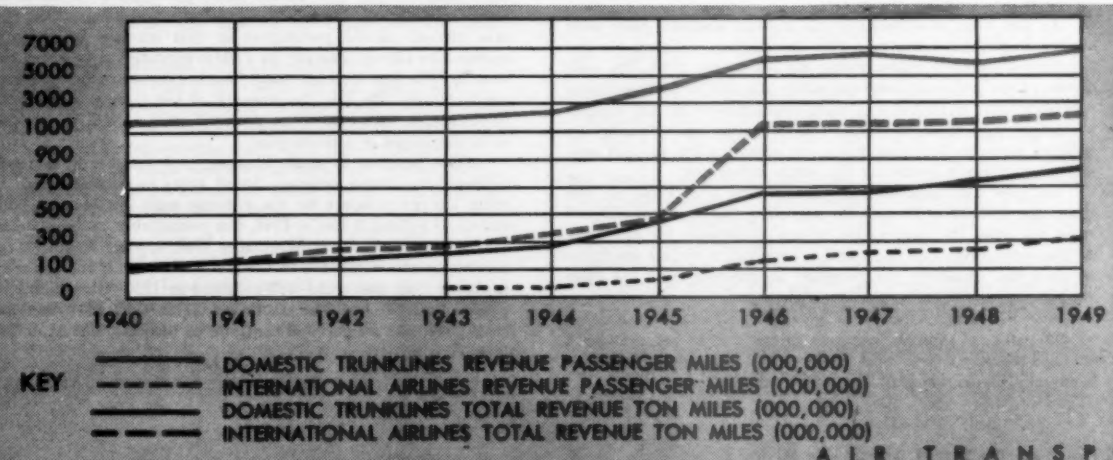
During his Naval service, he was Assistant Chief of the Bureau of Aeronautics. He became a pilot at the age of 50 and devoted eighteen months' time to the Daniel Guggenheim Fund for the promotion of Aeronautics.

Traffic

PASSENGERS · AIR MAIL · EXPRESS · FREIGHT

Year	Revenue Passengers (A)	Revenue Passenger Miles (000)	Passenger Load Factor	Air Mail Ton Miles (B)	Express Ton Miles	Freight Ton Miles	Total Rev. Ton Miles (000) (C)
DOMESTIC TRUNKLINES							
1940	2,802,781	1,052,156	63.72	10,117,858	3,476,224	.....	119,766
1941	3,848,882	1,384,733	64.32	13,118,015	5,258,551	.....	158,252
1942	3,136,755	1,418,042	76.45	21,162,102	11,901,793	.....	177,099
1943	3,019,736	1,634,135	89.98	36,061,868	15,139,359	.....	218,273
1944	4,045,965	2,178,207	90.77	51,139,973	16,991,598	.....	289,885
1945	6,376,843	3,336,278	88.16	64,998,094	20,509,753	1,168,534	427,978
1946	11,889,617	5,903,111	78.81	32,867,976	23,651,666	14,433,101	650,054
1947	12,279,016	6,103,879	65.67	32,878,825	28,533,362	35,213,590	683,360
1948	12,324,038	5,822,540	58.34	37,509,922	29,768,883	70,437,811	703,089
1949	13,781,718	6,579,287	59.2	40,874,333	27,395,380	94,469,728	803,358
(Figures before 1945 include territorial lines)							
TERRITORIAL AIRLINES							
1945	194,957	24,865	87.08	20,317	325,569	181,514	2,487
1946	298,710	38,033	79.04	25,243	112,372	389,199	3,872
1947	375,607	46,833	71.10	39,786	115,774	635,925	4,702
1948	418,372	52,864	65.28	53,490	134,400	581,122	5,145
1949	431,761	54,209	57.40	70,219	124,434	547,812	5,304
LOCAL SERVICE AIRLINES							
1945	4,452	1,312	52.78	74,510	11,482	.....	202
1946	25,118	6,812	37.92	60,088	24,354	25	688
1947	235,585	46,418	29.85	167,564	117,523	62,039	4,682
1948	425,695	87,928	27.14	361,984	189,550	264,794	9,040
1949	683,811	136,560	28.47	432,628	320,143	435,993	14,328
INTERNATIONAL AIRLINES							
1940	162,617	99,795	56.88	.....(D)	.....	.....	.....
1941	228,524	162,824	65.57	.....	.....	.....	.....
1942	269,345	236,956	75.68	.....	.....	.....	.....
1943	279,402	244,229	79.42	1,990,715	5,088,325	.....	34,352
1944	341,496	310,574	79.37	2,048,150	6,207,137	.....	39,705
1945	475,558	447,968	76.78	3,399,339	8,717,511	.....	60,019
1946	1,041,283	1,100,741	70.85	6,141,461	15,090,468	.....	136,771
1947	1,359,712	1,810,045	61.90	12,755,998	30,786,465	2,109,948	238,459
1948	1,372,749	1,888,997	57.38	17,122,170	41,404,334	4,188,467	265,172
1949	1,526,844	2,072,749	58.63	19,364,225	49,376,800	7,966,895	300,409

(A) Passenger figures for 1942 on, are unduplicated. (B) Does not include regular mail carried under special contract and foreign mail.
(C) Includes excess baggage and revenue passenger ton miles. (D) International air mail is U. S. mail only.

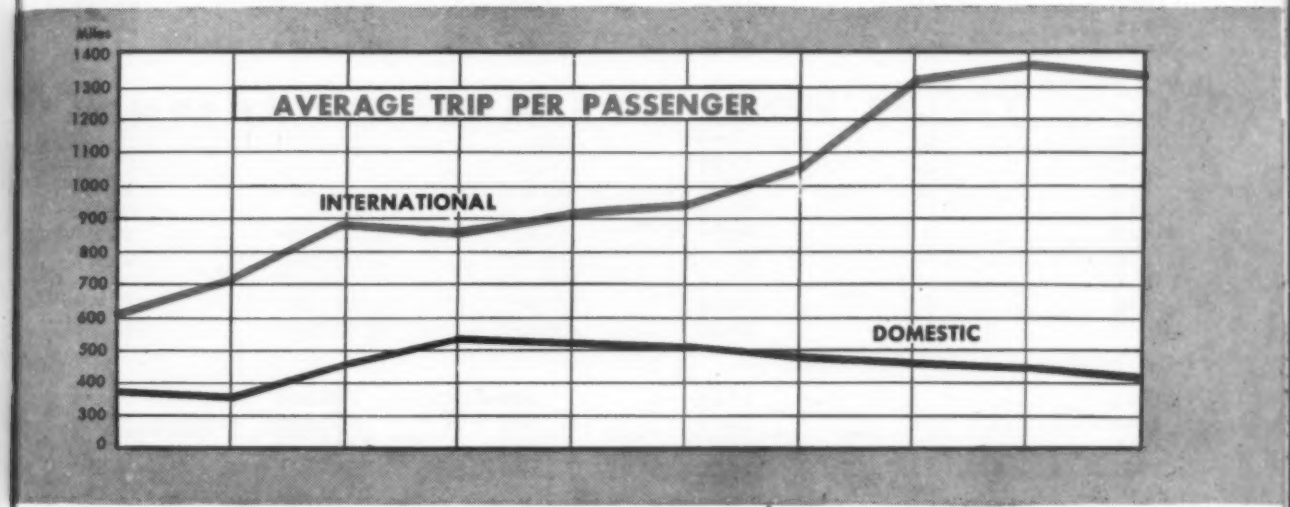


AIRLINE REVENUE PASSENGER MILES BY MONTHS

(In Thousands)

	DOMESTIC (A)				INTERNATIONAL			
	1946	1947	1948	1949	1946	1947	1948	1949
January	331,714	380,757	401,214	428,488	50,026	104,789	128,117	141,506
February	331,963	372,276	356,859	430,630	58,016	102,094	116,834	134,049
March	406,404	493,864	440,106	531,660	73,524	120,388	135,882	162,288
April	461,703	526,188	483,147	576,152	79,682	126,527	136,400	167,792
May	512,625	563,771	539,427	606,788	90,259	161,378	156,117	175,433
June	562,722	546,685	588,675	676,841	99,197	183,941	183,654	204,760
July	569,875	543,541	561,075	640,718	97,925	186,279	184,058	210,739
August	624,479	611,838	569,583	627,127	111,257	198,760	182,391	203,569
September	611,962	609,756	549,540	634,088	118,672	188,964	188,907	199,149
October	557,486	578,889	534,758	609,376	111,004	150,658	165,639	171,303
November	468,875	435,083	452,441	516,392	98,883	138,389	145,091	137,234
December	508,148	441,231	486,355	485,926	112,296	147,880	165,907	149,261
TOTAL	5,947,956	6,103,879	5,963,180	6,764,186	1,100,741	1,810,045	1,888,997	2,057,083

(A) Includes Trunkline, Territorial and Local Service airlines.



AVERAGE PASSENGER FARES AND TRIPS

	Average Passenger Fare per Mile		Average Trip Per Passenger	
	DOMESTIC*	INTER-NATIONAL	DOMESTIC*	INTER-NATIONAL
1940	5.07¢	8.83¢	375	614
1941	5.04¢	8.61¢	360	713
1942	5.28¢	8.85¢	452	880
1943	5.27¢	7.92¢	541	874
1944	5.35¢	7.82¢	538	910
1945	4.95¢	8.67¢	511	942
1946	4.63¢	8.31¢	487	1,057
1947	5.06¢	7.77¢	474	1,332
1948	5.76¢	8.01¢	453	1,370
1949 (est.)	5.65¢	8.05¢	446	1,358

*Trunklines only before 1945

PASSENGERS CARRIED

(Monthly Average)

	DOMESTIC	INTERNATIONAL
1932	39,670	5,960
1933	41,851	6,199
1934	39,622	8,067
1935	63,568	9,275
1936	86,837	7,310
1937	94,195	9,360
1938	113,809	9,105 (A)
1939	157,983	11,341
1940	253,218	14,182
1941	345,156	19,650
1942	296,614	23,017
1943	290,350	24,407
1944	396,776	29,722
1945	633,821	41,125
1946	1,142,113	88,845
1947	1,074,183 (A)	113,284 (A)
1948	1,121,092 (A)	114,321 (A)
1949	1,241,441 (A)	127,220 (A)

(A) Revenue passengers only.

Traffic

PLANES, SEATS AND MILES

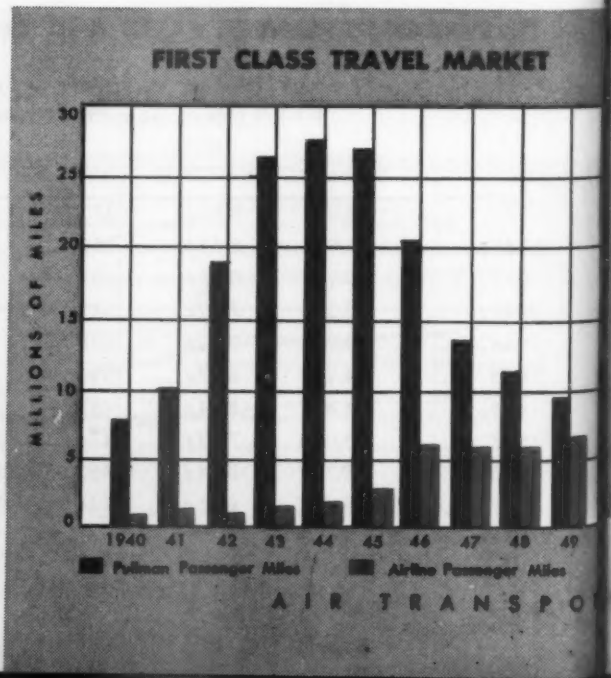
	Planes	Average Available Seats(A)	Route Miles	Revenue Miles in Passenger Service	Daily Average Revenue Miles Flown—All Services
DOMESTIC TRUNKLINES					
1940	369	16.54	44,643	109,871,044	300,823
1941	370	17.54	46,453	133,497,688	368,235
1942	186	17.91	49,297	109,648,081	305,043
1943	204	18.34	54,502	101,238,437	288,643
1944	288	19.05	62,937	133,532,043	379,050
1945	418	19.68	66,466	192,277,954	564,205
1946	659(A)	25.31	84,358	295,948,953	836,709
1947	737(B)	30.30	110,144	302,098,464	854,464
1948	779(C)	33.14	115,541	301,194,517	890,452
1949	771(D)	36.50	115,567	306,642,964	891,570
LOCAL SERVICE AIRLINES					
1945	3	8.92	2,115	278,553	4,852
1946	15	14.07	13,052	1,277,156	8,329
1947	40	18.74	17,226	8,299,228	27,678
1948	73	19.90	23,133	16,279,202	50,072
1949	99	22.46	29,963	21,355,083	67,444
INTERNATIONAL AIRLINES					
1940	68	18.28	53,322	.....	26,371
1941	83	18.03	N.A.	.....	39,480
1942	68	17.73	N.A.	.....	51,181
1943	70	17.51	27,211	.....	50,569
1944	70	18.48	29,708	.....	60,854
1945	92	18.91	38,885	30,860,064	89,339
1946	136	27.21	66,419	57,097,662	162,673
1947	138	35.18	178,768	83,126,087	236,934
1948	160	35.06	177,905	93,891,245	267,906
1949	193	37.39	209,468	97,550,463	288,954
TERRITORIAL AIRLINES					
1945	5	21.86	562	793,008	456
1946	11	23.12	562	1,006,928	664
1947	16	23.99	562	2,745,328	8,417
1948	15	24.09	744	3,361,034	9,893
1949	20	30.15	1,190	3,136,290	11,142

Territorial included in above table through 1944.
(A) 22 aircraft listed also on International certificates.
(B) 388 aircraft listed also on International certificates.
(C) 273 aircraft listed also on International certificates.
(D) 285 aircraft listed also on International certificates.

DOMESTIC AIRLINE PERCENTAGE OF FIRST CLASS TRAVEL MARKET

	Pullman Passenger Miles (000)	Airline Passenger Miles (000)	Total (000)	Airline Percentage of Total
1940	8,213,879	1,157,900	9,371,779	12.36
1941	10,070,407	1,506,303	11,576,710	13.01
1942	19,071,589	1,501,279	20,572,868	7.30
1943	25,891,466	1,670,935	27,562,401	6.06
1944	28,267,091	2,211,905	30,478,996	7.26
1945	27,275,789	3,408,290	30,684,078	11.11
1946	20,672,367	6,068,315	26,740,682	22.69
1947	13,515,792	6,307,690	19,823,482	33.40
1948	12,171,525	6,227,932	18,399,457	35.30
1949	9,493,687(A)	6,770,056	16,263,743	41.63

(A) Estimated.



SCHEDULED AIRLINE PASSENGER FATALITIES

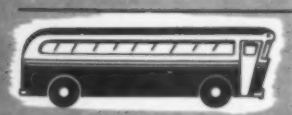
	Number of Domestic Fatalities	Fatalities Per 100 Million Passenger Miles	Number of International Fatalities	Fatalities Per 100 Million Passenger Miles	Total Number of Fatalities	Fatalities Per 100 Million Passenger Miles Domestic & International
1940	35	3.0	0	0	35	2.3
1941	35	2.3	2	1.2	37	2.2
1942	55	3.7	0	0	55	3.1
1943	22	1.3	10	3.9	32	1.7
1944	48	2.2	17	5.3	65	2.6
1945	76	2.2	17	3.7	93	2.4
1946	75	1.2	40	3.6	115	1.6
1947	199	3.2	20	1.1	219	2.7
1948	83	1.3	20	1.0	103	1.5
1949 (Est.)	93	1.3	0	0	93	1.0

COMPARATIVE TRANSPORTATION SAFETY RECORD

Passenger Fatalities and Rate of Passenger Fatalities per 100,000,000 passenger miles

	1941	1942	1943	1944	1945	1946	1947	1948	1949
Domestic Scheduled Air Transport Fatalities	35	55	22	48	76	75	199	83	93
Rate*	2.32	3.66	1.32	2.09	2.14	1.20	3.21	1.3	1.3

International Scheduled Air Transport Fatalities	2	0	10	17	17	40	20	20	0
Rate*	1.2	..	3.9	5.3	3.7	3.6	1.1	1.0	0



Bus Fatalities	"	"	"	"	120	140	140	120	"
Rate*	.24	.23	.22	.22	.17	.19	.21	.18	"

Railroad Passenger Fatalities	39	110	262	249	145	115	75	52	25
Rate*	.14	.17	.31	.26	.16	.18	.16	.13	.07

Passenger Automobiles and Taxicabs Fatalities	"	"	"	"	12,900	15,400	15,300	15,200	"
Rate*	4.0	2.7	2.7	2.9	2.9	2.5	2.3	2.1	"

*RATE PER 100 MILLION PASSENGER MILES "Not available

Financial

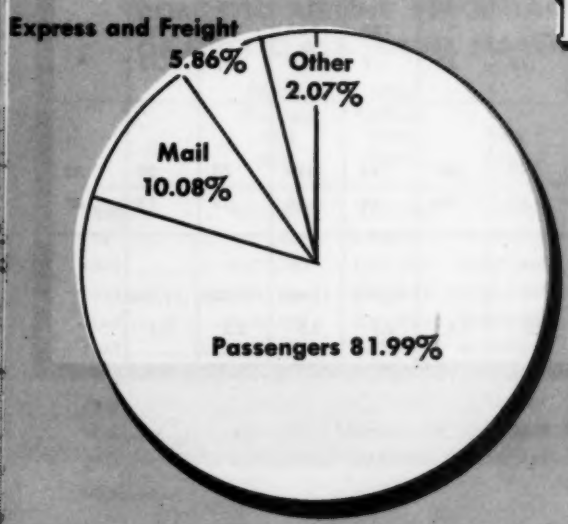
AIRLINE OPERATING REVENUES

Year	Passengers	% of Total	Mail	% of Total	Express & Frt.	% of Total	Others	% of Total	Total	Total %
DOMESTIC TRUNKLINES										
1940..	$52,723,332	69.27	$19,944,587	26.21	$ 2,060,174	2.71	$ 1,380,628	1.81	$ 76,108,721	100.0
1941..	68,996,812	71.81	22,297,222	23.21	2,891,356	3.01	1,896,829	1.97	96,082,219	100.0
1942..	73,649,588	69.28	22,957,807	21.60	6,749,413	6.35	2,953,354	2.78	106,310,162	100.0
1943..	86,045,193	72.37	23,562,311	19.82	8,015,163	6.74	1,280,230	1.08	118,902,897	100.0
1944..	115,012,203	72.59	32,739,723	20.66	7,897,056	4.98	2,797,643	1.77	158,446,625	100.0
1945..	164,427,954	77.85	32,831,438	15.59	10,470,649	4.96	3,395,082	1.60	211,125,123	100.0
1946..	272,573,483	87.50	19,880,164	6.38	13,269,913	4.27	5,776,089	1.85	311,499,649	100.0
1947..	303,193,782	86.01	23,325,630	6.62	18,888,245	5.36	7,082,710	2.01	352,490,367	100.0
1948..	334,735,598	80.98	47,837,531	11.57	23,788,568	5.76	6,991,189	1.69	413,352,886	100.0
1949..	378,061,069	81.99	46,494,761	10.08	27,016,998	5.86	9,549,484	2.07	461,122,312	100.0
LOCAL SERVICE AIRLINES										
1946..	$ 314,638	16.29	$ 1,558,614	80.71	$ 13,008	0.67	$ 44,797	2.33	$ 1,931,057	100.0
1947..	2,280,124	26.99	5,957,097	70.51	60,179	0.71	150,931	1.79	8,448,331	100.0
1948..	4,666,549	28.64	11,282,490	69.25	147,959	0.91	195,511	1.20	16,292,509	100.0
1949..	7,398,375	34.57	13,503,750	63.10	245,243	1.15	253,768	1.18	21,401,136	100.0
INTERNATIONAL AIRLINES										
1940..	$ 8,812,026	32.73	$13,439,361	49.92	$ 892,761	3.32	$ 3,778,047	14.03	$ 26,922,195	100.0
1941..	14,020,811	36.91	15,472,179	40.73	1,475,207	3.88	7,021,770	18.48	37,989,967	100.0
1942..	20,970,792	51.31	9,038,810	22.12	4,318,924	10.56	6,541,299	16.01	40,869,825	100.0
1943..	19,333,389	58.87	3,624,223	11.04	4,401,466	13.40	5,480,095	16.69	32,839,173	100.0
1944..	24,287,050	62.46	2,889,093	7.43	5,405,470	13.90	6,300,788	16.21	38,882,401	100.0
1945..	38,858,800	56.23	12,264,219	17.75	7,314,743	10.58	10,673,311	15.44	69,111,073	100.0
1946..	91,416,767	62.29	25,060,600	17.08	11,413,268	7.78	18,863,467	12.85	146,754,102	100.0
1947..	140,652,113	67.29	32,299,890	15.45	17,526,276	8.39	18,531,252	8.87	209,009,531	100.0
1948..	151,337,705	60.72	57,335,669	23.00	20,808,679	8.35	19,752,146	7.93	249,234,199	100.0
1949..	167,018,535	58.94	67,736,963	23.90	23,986,378	8.46	24,644,390	8.70	283,386,266	100.0

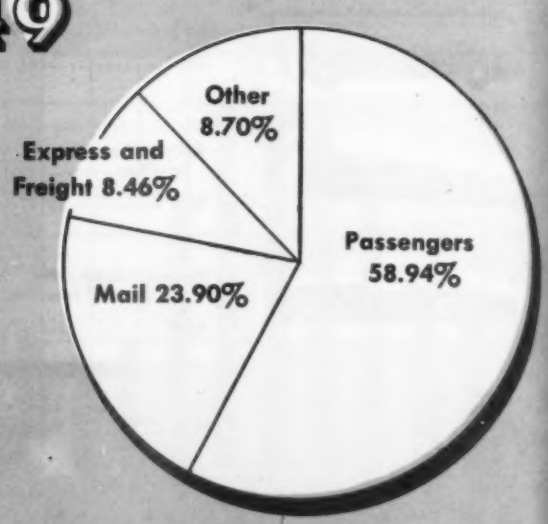
WHERE THE DOMESTIC AIRLINE DOLLAR COMES FROM

TRUNKLINES ONLY

1949



WHERE THE INTERNATIONAL AIRLINE DOLLAR COMES FROM



AIRLINE OPERATING EXPENSES

DOMESTIC TRUNKLINES	Aircraft Operating Expenses	% of Total	Ground and Indirect Expenses	% of Total	Total Operating Expenses
1940	$35,178,395	50.1	$35,028,420	49.9	$70,896,615
1941	44,932,205	50.0	44,986,928	50.0	89,919,134
1942	36,392,090	43.1	47,974,400	56.9	84,366,489
1943	34,613,411	36.2	60,949,609	63.8	95,563,020
1944	45,150,125	36.3	79,371,967	63.7	124,522,092
1945	69,222,625	38.3	111,403,704	61.7	180,626,329
1946	127,411,526	40.18	189,709,954	59.82	317,121,480
1947	163,202,631	43.71	210,187,837	56.29	373,390,468
1948	189,790,818	46.15	221,486,955	53.85	411,277,773
1949*	154,715,596	47.85	168,598,036	52.15	323,313,632
*9 months only.					
LOCAL SERVICE AIRLINES					
1946	$999,175	48.49	$1,064,254	51.65	$2,060,429
1947	4,462,227	49.20	4,607,078	50.80	9,069,305
1948	8,321,371	52.26	7,602,141	47.74	15,923,512
1949*	8,576,095	52.87	7,646,424	47.13	16,222,519
*9 months only.					
INTERNATIONAL AIRLINES					
1940	N.A.	N.A.	N.A.	N.A.	N.A.
1941	N.A.	N.A.	N.A.	N.A.	N.A.
1942	N.A.	N.A.	N.A.	N.A.	N.A.
1943	$11,991,694	37.38	$20,087,295	62.62	$32,078,989
1944	13,352,194	34.04	25,874,474	65.96	39,226,668
1945	22,918,033	37.11	38,846,750	62.89	61,764,783
1946	52,465,127	37.51	87,377,719	62.49	139,842,846
1947	93,765,716	44.80	115,527,815	55.20	209,293,532
1948	110,992,589	47.17	124,294,394	52.83	235,286,983
1949*	91,135,640	47.51	100,697,428	52.49	191,833,068
*9 months only.					

DIRECT AIRCRAFT OPERATING EXPENSES

DOMESTIC TRUNKLINES	Flying Operations	% of Total	Direct Maintenance Flight Equip.	% of Total	Depreciation Flight Equip.	% of Total
1940	$22,092,628	31.5	$7,495,998	10.7	$5,589,769	7.9
1941	27,391,837	30.5	9,789,797	10.9	7,750,571	8.6
1942	21,865,924	25.9	8,664,437	10.3	5,861,730	6.9
1943	20,739,121	21.7	9,132,260	9.5	4,742,030	5.0
1944	28,238,316	22.7	11,892,963	9.6	5,018,845	4.0
1945	43,421,033	24.0	16,392,654	9.1	9,408,938	5.2
1946	69,729,554	21.99	32,490,116	10.25	25,191,856	7.94
1947	85,932,761	23.01	41,029,360	10.99	36,240,510	9.71
1948	104,163,765	25.33	46,093,128	11.21	39,533,925	9.61
1949*	88,375,630	27.33	37,166,012	11.50	29,173,954	9.02
*9 months only.						
LOCAL SERVICE AIRLINES						
1946	$497,438	24.14	$347,727	16.88	$151,010	7.33
1947	2,203,155	24.29	1,336,677	14.74	922,395	10.17
1948	4,526,827	28.43	2,348,309	14.75	1,446,234	9.08
1949*	4,602,913	28.37	2,262,285	13.95	1,710,897	10.55
*9 months only.						
INTERNATIONAL AIRLINES						
1940	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1941	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1942	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1943	$8,074,416	25.17	$2,172,952	6.77	$1,744,326	5.44
1944	8,469,557	21.59	3,030,386	7.73	1,852,251	4.72
1945	15,297,599	24.77	5,198,602	8.42	2,421,832	3.92
1946	32,447,634	23.20	11,063,761	7.91	8,953,731	6.40
1947	53,188,663	25.41	21,997,077	10.51	18,579,977	8.88
1948	67,163,026	28.55	24,241,052	10.30	19,588,511	8.33
1949*	53,730,367	28.01	19,970,820	10.41	17,434,453	9.09
*9 months only.						

Financial

AIRLINE INDUSTRY NET OPERATING INCOME*

	DOMESTIC TRUNKLINES		FEEDERLINES		INTERNATIONAL	
	Operating Income	% Gross Operating Revenue	Operating Income	% Gross Operating Revenue	Operating Income	% Gross Revenue
1940	$5,914,506	7.77	..	..	N.A.	..
1941	7,293,286	7.59	..	..	N.A.	..
1942	25,980,988	24.44	..	..	N.A.	..
1943	26,974,990	22.36	..	..	N.A.	..
1944	36,093,932	22.78	..	..	N.A.	..
1945	33,451,627	15.84	..	..	N.A.	..
1946	(5,228,439)	Loss	($129,372)	Loss	$6,911,256	4.71
1947	(20,900,101)	Loss	(620,974)	Loss	(284,001)	Loss
1948	2,075,114	0.50	368,998	2.34	13,947,216	5.60
1949	23,562,699	5.11	(1,055,000)	Loss	20,064,922	7.08

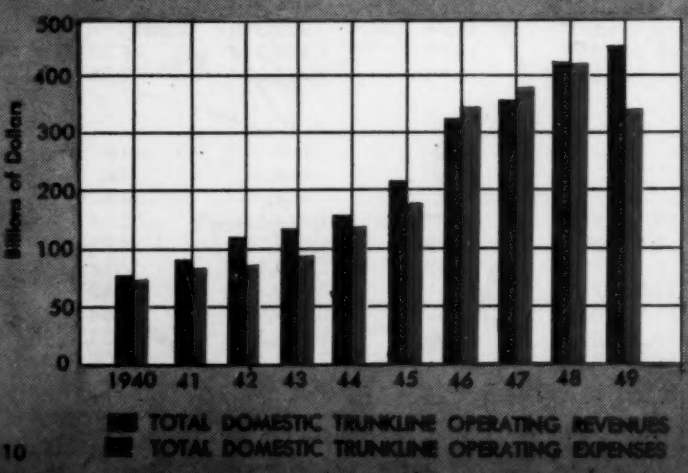
* All income figures are before Federal income taxes.

ASSETS & LIABILITIES · DOMESTIC TRUNK AIRLINES

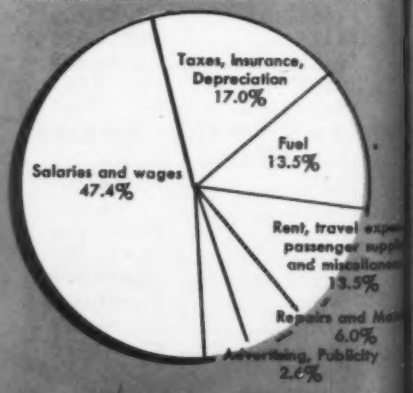
SELECTED YEARS	1940	1948	1949(A)	1949(B)
Current assets	$36,017,487	$171,858,000	$204,753,000	$195,548,186
Flight equipment (net)	31,221,243(C)	192,353,000	180,248,000	176,458,316
Other operating property	.....	63,942,000	63,336,000	64,504,201
Non-operating property	117,026	5,780,000	3,880,000	4,140,152
Other assets	4,030,661	50,307,814	47,701,000	47,626,210
Total assets	71,386,417	484,240,814	499,918,000	488,277,065
Current liabilities	15,391,299	99,836,921	102,330,000	109,192,327
Long term debt	4,257,770	172,624,519	154,695,000	145,308,171
Capital stock	27,390,060	121,312,622	123,707,000	123,599,063
Capital surplus	21,165,185	60,573,065	63,418,000	63,199,122
Earned surplus	1,638,089	13,943,165	36,323,000	22,878,642
Operating reserves	273,173	2,387,158	3,251,000	2,855,735
Other liabilities	1,270,841	13,563,165	16,194,000	14,099,588
Net worth and liabilities	71,386,417	484,240,814	499,918,000	488,277,065
Net worth	50,193,334	195,828,851	223,448,000	209,676,827

(A) As of September 30. (B) As of June 30. (C) Includes other operating property.

10 YEAR TREND OF TOTAL DOMESTIC TRUNKLINE OPERATING REVENUES AND EXPENSES



WHERE THE DOMESTIC AIRLINE DOLLAR GOES (FIRST 9 MONTHS 1949)



POST OFFICE DEPARTMENT AIR MAIL REVENUES AND PAYMENTS

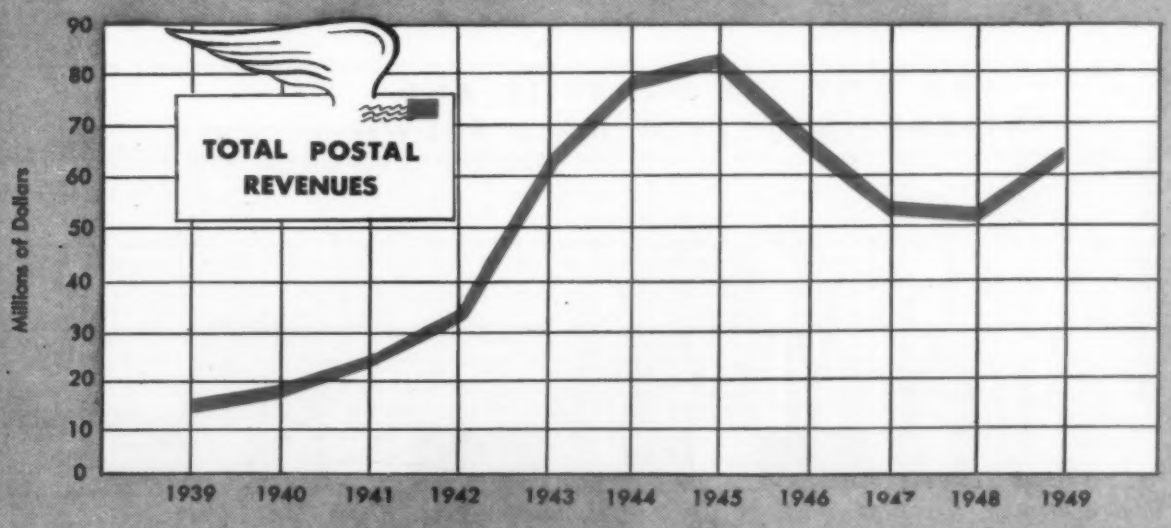
DOMESTIC AIRLINES

Fiscal Year Ending June 30	Postal Revenues	Payments to Airlines	All Allocated Costs (C)	Net Result for P.O.
1939	$ 16,326,358	$ 17,020,169	$ 24,887,824	−$ 8,561,466
1940	19,122,906	19,425,732	28,341,758	− 9,218,852
1941	23,920,465	20,687,220	31,174,112	− 7,253,647
1942	33,417,367	23,473,170	37,092,816	− 3,675,449
1943(A)	62,818,568	23,308,477	44,463,207	+ 18,355,361
1944	79,412,510	28,401,371	49,794,609	+ 29,617,901
1945	81,237,389	35,536,292	49,902,849	+ 31,334,540
1946	68,427,924	27,865,112	49,578,803	+ 18,849,121
1947	54,356,782	33,764,000	73,446,659	− 19,089,877
1948	53,586,950	47,000,000	80,662,381	− 27,075,431
1949	65,385,603	66,973,317	102,646,667	− 37,261,064
	$558,012,822	$343,454,855	$571,991,685	−$13,978,863

INTERNATIONAL AIRLINES

Fiscal Year Ending June 30	Postal Revenues	Payments to Airlines	All Allocated Costs	Net Result for P.O.	Domestic & International Total Net Result for P.O.
1939	$ 3,925,513	$ 9,327,445	$ 9,903,372	−$ 5,977,859	−$14,539,325
1940	5,914,405	12,438,825	13,223,146	− 7,308,741	− 16,527,593
1941	9,309,793	15,639,439	16,584,395	− 7,274,602	− 14,528,249
1942	12,015,863	14,411,422	15,598,395	− 3,582,532	− 7,257,981
1943(A)	28,500,000	5,563,283	24,057,541	+ 4,442,459	+ 22,797,820
1944(B)	51,276,499	2,969,618	30,071,926	+ 21,204,573	+ 50,822,474
1945	110,675,066	6,135,402	58,634,868	+ 52,040,198	+ 83,374,738
1946	58,081,237	13,032,000	52,610,909	+ 5,470,328	+ 24,319,449
1947	21,772,598	27,262,000	33,144,101	− 11,371,503	− 30,461,380
1948	23,815,519	41,402,711	51,571,220	− 27,755,701	− 54,831,132
1949	25,695,375	56,748,980	73,418,670	− 47,723,295	− 84,984,359
	$ 350,981,868	$204,931,125	$378,818,543	−$27,836,675	−$41,815,538

Beginning with 1939, CAB rate superseded contract rates.
(A) No cost ascertainment report for 1943. Expenses are estimates.
(B) During war years overseas mail except to South America was carried by Air Transport Command. Sums paid to airlines negligible.
(C) Includes costs of field air mail salaries.



Air Mail

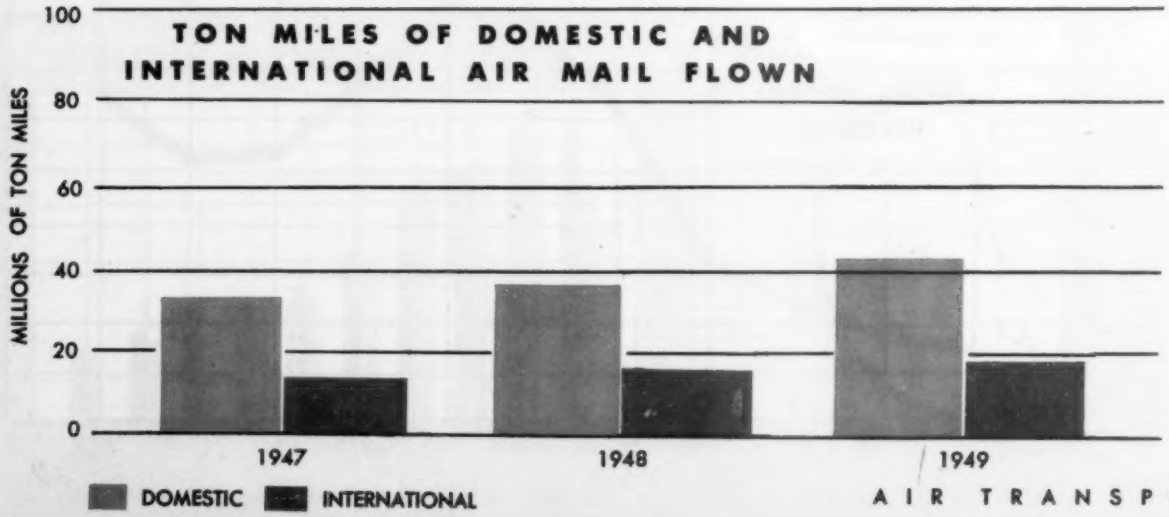
AIR MAIL • MILES AND PAYMENTS

Fiscal Year Ending June 30	Payments Per Plane Mile	DOMESTIC AIRLINES Pound Miles Per Route Mile	Revenue Mail Miles Flown	Route Miles Air Mail Service	Pound Miles Performed (000)	INTERNATIONAL Plane Miles Flown	Payments Per Plane Mile
1939.....	.326	426,608	52,141,758	37,080	15,818,617	5,357,405	1.74
1940.....	.328	492,090	59,236,453	37,943	18,671,367	5,907,124	2.10
1941.....	.273	513,579	75,689,839	43,411	22,294,962	8,238,349	1.65
1942.....	.263	703,768	89,307,567	44,623	31,404,257	8,858,294	1.61
1943.....	.262	1,251,401	88,963,296	45,304	56,492,340	15,633,483	.36
1944.....	.264	1,734,022	107,650,804	49,482	84,579,690	19,485,789	.17
1945.....	.213	2,162,025	166,576,371	56,849	122,908,961	24,275,760	.25
1946.....	.121	1,772,013	221,724,860	57,377	101,672,777	40,659,256	.27
1947.....	.069	658,592	314,505,965(A)	102,454	67,475,414(A)	61,213,887	.31
1948.....	.109	520,562	321,661,665(A)	130,093	67,716,848(A)	91,439,534	.44
1949.....	.191	531,263	333,245,576(A)	155,314	82,513,520(A)	97,459,137	.62

(A) Subject to adjustment.

MAIL TON MILES FLOWN MONTHLY

	DOMESTIC			INTERNATIONAL		
	1947	1948	1949	1947	1948	1949
January.....	2,664,908	2,757,163	3,330,170	744,178	1,105,852	1,629,104
February.....	2,643,005	2,637,334	3,246,336	777,384	1,131,463	1,477,374
March.....	2,847,484	3,069,795	3,677,885	1,091,284	1,337,956	1,651,236
April.....	2,782,585	2,843,869	3,598,234	1,098,071	1,313,260	1,692,416
May.....	2,798,107	2,955,846	3,364,766	1,140,266	1,308,798	1,572,508
June.....	2,655,748	2,900,079	3,274,250	1,030,788	1,305,528	1,510,107
July.....	2,582,940	2,798,491	2,954,599	1,017,878	1,321,279	1,472,381
August.....	2,502,574	2,926,753	3,159,571	1,027,041	1,278,551	1,463,055
September.....	2,487,413	3,107,066	3,137,299	964,906	1,246,356	1,401,918
October.....	2,811,656	3,363,773	3,292,972	1,059,957	1,473,950	1,492,467
November.....	2,594,889	3,401,554	3,357,811	1,036,435	1,709,942	1,497,093
December.....	3,714,866	5,163,673	5,018,961	1,767,810	2,589,235	2,506,110
TOTAL.....	33,086,175	37,925,396	41,412,854	12,755,998	17,122,170	19,365,769

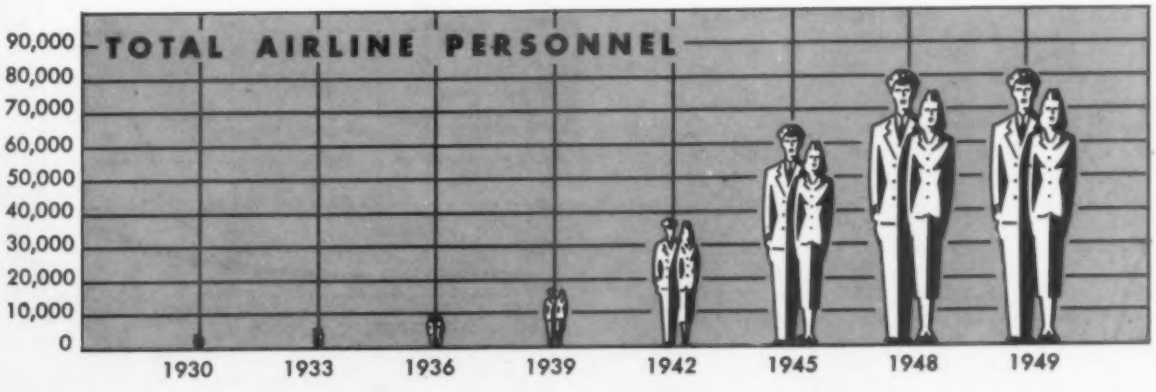


DOMESTIC AIRLINES

Year	Pilots & Copilots	Pursers Stewards Stewdsses.	Other Flight Personnel	Meteorologists & Dispatchers	Mechanics	Other Hangar and Field Personnel	Ticket Agents and Reservationists, Office Employees	All Others	Total
1932	640	0	0	0	1,641	939	800	0	4,020
1933	680	0	0	0	1,810	1,089	790	0	4,369
1934	667	0	0	0	1,650	923	961	0	4,201
1935	874	213	0	0	2,016	470	2,372	0	5,945
1936	1,055	333	0	0	2,164	546	2,981	0	7,079
1937	1,064	339	0	0	2,228	658	3,297	0	7,586
1938	1,135	358	0	186	2,436	712	3,715	472	9,008
1939	1,412	536	0	181	2,822	877	4,583	228	10,639
1940	1,934	914	18	193	4,054	1,880	5,855	1,131	15,984
1941	2,217	1,028	19	220	4,423	2,224	7,807	1,285	19,223
1942	2,194	753	112	1,581	9,348	2,969	7,717	2,236	26,910
1943	2,125	845	8	1,685	8,271	3,356	10,973	2,391	29,654
1944	2,879	1,322	11	1,870	7,136	3,509	12,201	2,270	31,198
1945	4,967	2,075	108	2,613	10,844	7,012	19,241	3,453	50,313
1946	5,712	3,342	98	3,577	16,107	10,307	24,626	5,413	69,182
1947	5,030	3,061	181	2,619	15,372	8,407	21,980	2,348	58,998
1948	5,134	2,975	312	2,791	14,822	9,118	16,864	7,250	59,266
1949(Est.)	5,277	3,237	598	2,735	14,325	9,530	16,798	7,516	60,016

INTERNATIONAL AIRLINES

1932	77	0	0	0	435	576	502	0	1,590
1933	77	0	0	0	517	750	584	0	1,926
1934	92	0	0	0	558	928	698	0	2,276
1935	121	0	0	0	602	1,048	636	0	2,407
1936	186	57	0	0	710	1,221	742	0	2,916
1937	291	81	0	0	1,050	1,698	880	0	4,000
1938	278	93	0	0	977	1,923	995	0	4,266
1939	287	103	7	0	1,181	2,138	1,559	0	5,275
1940	340	122	15	0	1,359	2,397	1,834	0	6,067
1941	447	182	30	0	1,966	2,707	1,903	0	7,235
1942	452	378	129	29	3,534	4,415	3,366	0	12,803
1943	207	147	322	511	2,140	1,835	1,859	2,604	9,625
1944	466	194	266	631	2,827	2,239	3,033	1,753	11,409
1945	930	411	938	864	5,099	2,435	4,663	2,628	17,968
1946	1,508	1,079	1,405	1,454	7,269	2,463	6,961	5,233	27,372
1947	1,603	1,016	1,152	1,211	5,774	3,201	10,679	1,518	26,154
1948	1,532	1,032	1,161	901	4,414	2,899	3,908	4,826	20,673
1949(Est.)	1,584	1,099	1,101	914	3,488	2,163	3,631	4,196	18,176



AIRCRAFT UTILIZATION DOMESTIC AIRLINES

(Selected Years)

	No. of Engines	1940 No. Planes	1940 Av. Mi. Per Day	1945 No. Planes	1945 Av. Mi. Per Day	1948 1/ No. Planes	1948 1/ Av. Mi. Per Day	*1949 1/ No. Planes	*1949 1/ Av. Mi. Per Day
Beechcraft	2	....	.....	0.8	66	6.5	219	....	.....
Boeing									
247-D	2	34.9	468	....	.....	0.8	800	....	.....
SA-307B	4	3.1	1,354	3.6	2,094	5.0	1,326	5.0	1,306
377	4	....	.....	....	.....	....	.....	7.0	306
Consolidated-Vultee									
Convair	2	....	.....	....	.....	9.3	907	92.0	834
Douglas									
DC-2	2	42.2	715	....	.....	....	.....	....	.....
DC-3	2	145.2	1,198	314.4	1,756	429.2	1,194	404.0	898
DST	2	38.6	1,569	....	.....	....	.....	....	.....
DC-4	4	....	.....	....	.....	155.0	1,317	158.0	947
DC-6	4	....	.....	....	.....	46.3	1,825	104.0	1,626
Lockheed									
Electra	2	33.8	58.3	1.3	727	....	.....	....	.....
Lodestar	2	4.4	661	17.7	1545	12.0	258	11.0	909
Constelation	4	....	.....	....	.....	30.9	1,828	51.0	1,688
Sikorsky	2	6.0	203	2.0	184	....	.....	....	.....
Stinson									
Single Motor	1	....	.....	10.9	404	7.0	439	....	.....
Tri-motored	3	2.0	109	4.0	61	....	.....	....	.....
Martin 202	2	....	.....	....	.....	15.4	843	24.0	1,107
Curtiss 46	2	....	.....	....	.....	2.0	73	2.0	129

*1/ Includes local service and territorial lines. 1949 data for 10 months only.

FUEL CONSUMED

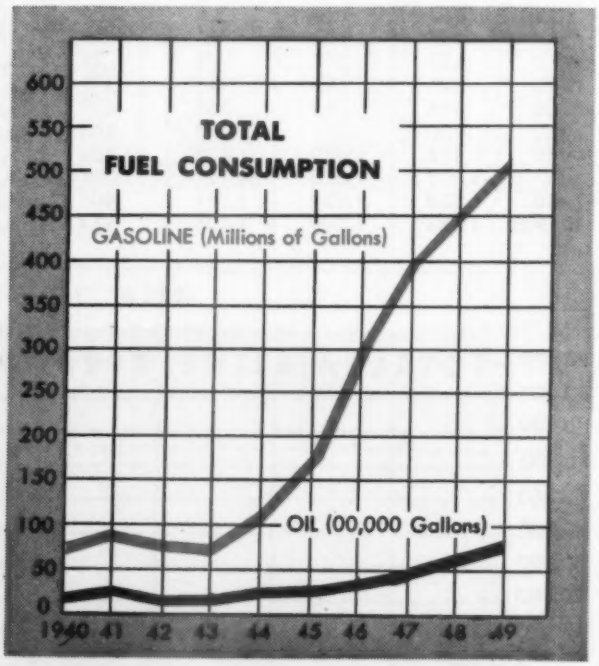
INTERNATIONAL AIRLINES

	Gasoline (Gallons)	Oil (Gallons)
1940	8,860,034	183,518
1941	11,302,376	(A) 276,454
1942	16,811,959	(A) 329,154
1943	13,760,354	242,577
1944	15,648,426	243,836
1945	25,086,866	315,930
1946	59,543,323	767,569
1947	102,723,690	1,224,810
1948	123,403,583	1,296,952
1949	135,088,198	1,567,739

(A) Estimated.

DOMESTIC AIRLINES

1940	65,674,895	1,104,289
1941	81,657,020	1,282,064
1942	68,908,271	1,008,371
1943	65,025,412	894,262
1944	89,513,646	1,266,741
1945	134,824,120	1,709,566
1946	236,388,751	2,876,250
1947	294,196,130	3,733,728
1948	332,423,553	4,250,151
1949	372,217,484	4,684,760



AIRPORTS BY CLASSES
(AS OF DECEMBER 31)

Length of Runways	1941	1942	1943	1944	1945	1946	1947[A]	1948[A]	1949[A]
1800–2700 ft. Class I and under	1,523	1,238	910	1,215	1,620	2,491	3,525	4,006	4,054
2500–3500 ft. Class II	702	905	774	936	1,091	758	845	972	994
3500–4500 ft. Class III	187	367	430	464	484	485	422	471	501
4500–5700 ft. Class IV	72*	299*	366	473	488	443	314	361	368
5700–6700 ft. Class V	....	....	289	339	343	313	100	131	135
6700–7700 ft. Class VI and over	....	....	....	....	....	....	52	75	79
TOTALS	2,484	2,809	2,769	3,427	4,026	4,490	5,258	6,016	6,131

* Class IV and over. (A) Civil Airports only.

USE OF AIRPORTS—Number of Flight Operations

Fiscal Year	Military	Civil	Air Carrier	Air Carrier Percentage
1944	8,390,000	3,594,000	916,000	7.1
1945	6,460,567	3,343,303	1,409,102	12.6
1946	2,457,878	5,091,671	2,042,049	21.3
1947	1,402,909	11,262,191	2,630,472	17.2
1948	1,871,413	13,820,525	3,052,781	16.3
1949	2,689,408	11,406,562	3,489,061	19.8

All figures include LaGuardia Airport, which was operated by New York City until October 1, 1946 when CAA took over control towers there.

AIRLINE POINTS—Certificated as of 31 December 1949

	Points in Use	Points Not Served	Total points Authorized
Trunk lines, exclusively	208	41	249
Local service airlines, exclusively	158	217	375
Combination trunk and local service	159	10	169
Cargo, exclusively	...	6	6
TOTAL	525	274	799

ROUTE MILEAGE—As of December 31, 1949

DOMESTIC TRUNK

American	20,026
Braniff	4,831
Capital	5,810
Catalina	47
Chicago & Southern	6,119
Colonial	1,382
Continental	3,800
Delta	7,349
Eastern	13,202
Hawaiian	402
Inland	1,913
Mid Continent	4,474
National	2,702
Northeast	2,182
Northwest	11,130
Pan American	34
TWA	11,582
Trans Pacific	402
United	15,881
Western	3,103
TOTAL	116,371

TOTALS

Total Trunk & Local Service	146,334
Total International and Overseas	209,854
GRAND TOTAL	356,188

INTERNATIONAL

American Overseas	9,134
Braniff	7,597
Caribbean Atlantic	386
Chicago & Southern	3,270
Colonial	2,030
Eastern	917
National	445
Northwest	15,977
Pan American	127,930
Pan American-Grace	10,653
TWA	23,317
UMCA	382
Western	1,640
TOTAL	203,678

OVERSEAS

Eastern	1,040
Northwest	2,736
United	2,400
TOTAL	6,176

LOCAL SERVICE

All American	3,395
Air News	425
Arizona	1,020
Bonanza	664
Central	1,347
Challenger	2,394
Empire	754
Helicopter Air	308
Inland Air Ferries	227
Los Angeles Airways	373
Mid-West	1,280
Monarch	1,683
Parks	2,785
Piedmont	1,904
Pioneer	2,181
Purdue	106
Robinson	561
Southern	1,332
Southwest	1,272
Trans Texas	2,061
Turner	661
West Coast	885
Wiggins	633
Wisconsin Central	1,712
TOTAL	29,963

AIR TRANSPORT ASSOCIATION OF AMERICA

Team-work for progress is the objective of the Air Transport Association of America. Its activities range from development of safety to study of legislation; from economic surveys to analysis of operating costs; from development of better air terminals to the full promotion of air transport by the public. Through ATA the experience and attainments of individual airlines are quickly combined to the advantage of all. Through ATA the efforts of eight government agencies and four private agencies are welded into unified action for the benefit of the travelling public and the national welfare.

The ATA is the cooperative industry organization founded in 1936 and composed of the United States Flag Airlines certificated by the Civil Aeronautics Board for scheduled service over regularly established routes. The operations of the member carriers are domestic, territorial, and international in scope. Their field covers the transportation of passengers, property and mail by aircraft. The Association concluded the year 1949 with 34 members operating in and from the United States; together with two associate members in Canada, two associates in Latin America, and one in Hawaii. Thirteen members are local service airlines which are duly certificated regional carriers.

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AMERICAN AVIATION is honored to present the Air Transport Association's 11th Annual Edition of "Facts and Figures" (formerly called "Little Known Facts") about the U. S. scheduled certificated airlines. These Facts and Figures, assembled by ATA from revised data filed by the carriers with the Civil Aeronautics Board, show significant development and progress of the air transport industry throughout the years.

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†Turner Airlines, Inc.
Weir Cook Airport, Indianapolis, Ind.

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Western Air Lines, Inc.
6060 Avion Drive, Los Angeles 45, Calif.

†Wisconsin Central Airlines, Inc.
Municipal Airport, Madison, Wis.

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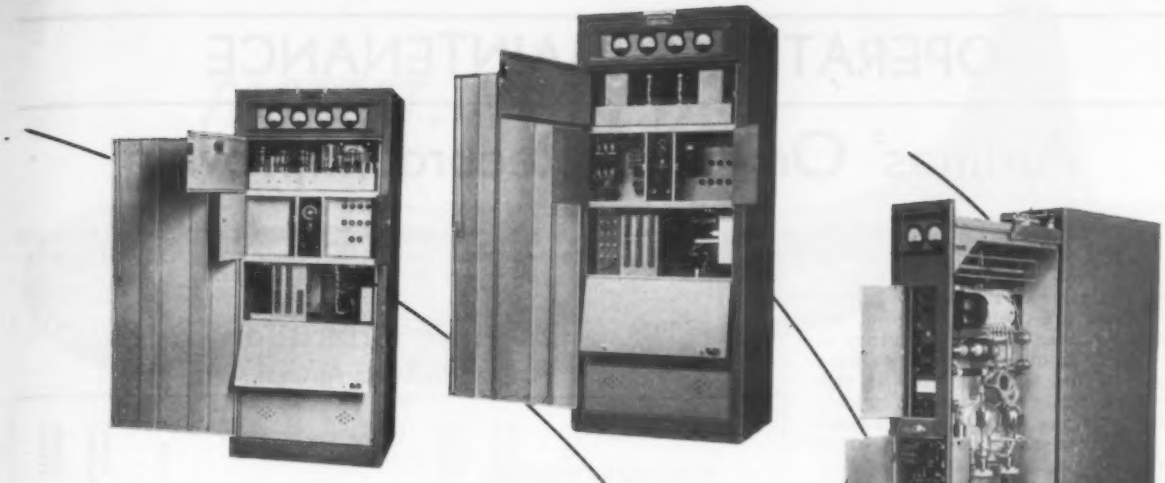
*Associate member
†Local Service Airline



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NEW... UNIT CONSTRUCTION PROVIDES OPERATING FLEXIBILITY

A flexible, multifrequency station can be formed from a combination of 96D and 96-200C Transmitters, one or two 50H Modulators and a 36D Rectifier. This provides for either simultaneous transmission on several frequencies or the selection of an individual frequency best suited to your particular communication problem.

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All controls are located on the front of the transmitter: all R. F. stages and antenna tuning, under and overload and tone-keying adjustments, selection switch for external frequency shift excitation, rotary meter switch, exciter output control.

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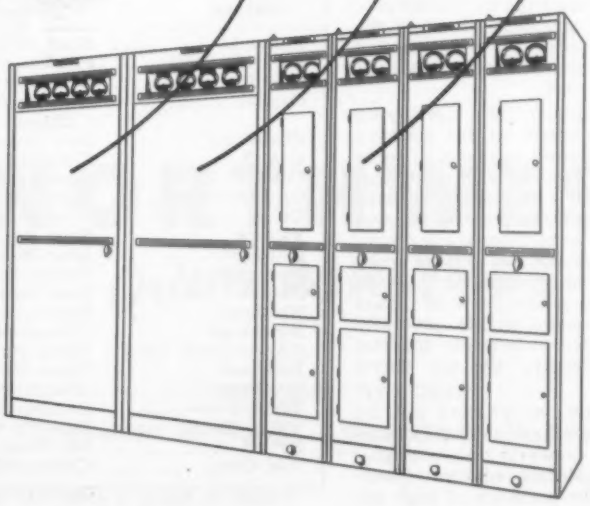

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Airlines' On-Time Record Improving

THERE ARE many indexes to the type of service provided by the airlines. Two of the more important ones, exclusive of the type of equipment used, are the percentage of on-time operations and the frequency of service. It is of little value to have rapid service between cities if that service is only available at widely scattered times. Nor is it impressive to have frequent schedules on which the passenger can not depend.

Too often in the past the passenger who depended on a particular flight with the intention of making a half-hour connection on the other end was a disappointed customer, reluctant to try again. This wasn't cured in 1949, but, as can be seen in the accompanying charts, the condition was vastly improved.

The trip frequencies shown here are a cross-section of the trip frequencies provided by the airlines in every section of the country. It can be seen that two airlines serving the Washington-New York route provided 60 trips per day between these key cities. This means there were frequent trips during every hour of the day when the potential passenger would be interested in a connection.

High trip frequencies did not exist only on domestic routes nor on short route segments. Note that Colonial operates 15 trips per day between Montreal and New York, Pan American operates eight flights per day between Miami and Havana and another six between New York and San Juan. Not shown on the chart are such operations as Pan American's 24 trips per week between the west coast and Honolulu.

Totaling all the trips by all the airlines between any pair of cities results in even more impressive figures than the trip frequencies of individual carriers listed here.

The introduction of high-flying post-war equipment on the nation's air lanes was bound to result in some new trip time records. Flying at high altitudes with favorable winds, noticeable time reductions have been experienced. The airlines are not particularly interested in setting such records, but the results are always of interest. The passenger who makes one of these record flights generally becomes a more ardent air traveler and, unconsciously, an air travel salesman.

Some airlines, as pointed out by Braniff Airways, have issued instructions to flight crews to reduce engine power and maintain regular schedules even in the presence of high tail winds. This preserves the engines and helps reduce maintenance costs. In either case, the ability to travel at high altitudes under more favorable flying conditions has produced interesting results.

On-Time Operation

U. S. Scheduled Airlines

AIRLINE	% Route Mileage Completed	% On Time Operation Best Summer Month —	% On Time Operation Best Winter Month —	AIRLINE	% Route Mileage Completed	% On Time Operation Best Summer Month —	% On Time Operation Best Winter Month —
American	98.2	84.3	73.1	National	97.9	NA	NA
AAA	92.9	NA	NA	Northeast	93.5	88.5	87.2
Braniff	97.8	81.9	59.2	Northwest	97.2	NA	NA
Capital	96.3	89.0	69.0	PAA (Latin Div.)	98.9	80.0	75.0
Challenger	95.2	NA	NA	PAA (Pac. Div.)	98.1	82.0	72.0
C & S	96.8	NA	NA	Robinson	92.3	NA	NA
Colonial	100.0	90.7	86.9	Southern	94.6	NA	NA
Continental	98.8	89.0	80.0	Trans-Texas	97.8	NA	NA
Delta	97.6	87.0	NA	TWA (Domestic)	96.4	60.2	40.6
Eastern	97.5	75.0	NA	TWA (Int.)	99.1	47.2	30.8
Mid-Continent	97.7	69.2	43.2	United	97.7	86.9	68.4
Monarch	93.1	NA	NA	West Coast	95.3	99.9	97.2
				Wis.-Cent.	89.4	78.0	50.0

NA—Not Available. All data shown taken from airline answers to an AMERICAN AVIATION survey.

NOTE: The year 1949 marked a growing consciousness of on time operations. "On Time" operation figures shown here provide an index to the ever improving schedule operations of the airlines. There is no fixed definition of "on time" operation. Some airlines appear to use arrival at point of destination within 15 minutes of scheduled time as a basis. Others use scheduled departure times as the index rather than arrival times. For this reason figures must be weighed carefully.

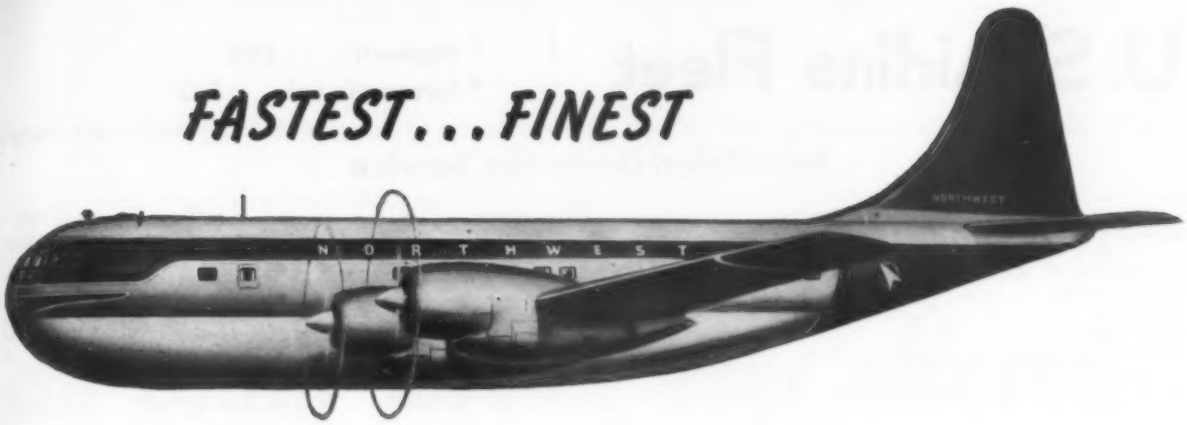
Peak Trip Frequencies

U. S. Scheduled Airlines

AIRLINE	Route	Daily Trips	Route	Daily Trips
American	New York-Washington	24	New York-Boston	28
All American	Pittsburgh-New York	8	Pittsburgh-Atlan. City	6
Braniff	Dallas-Chicago	14	Dallas-Houston	14
Capital	Washington- Detroit-Chicago-Milwaukee	56	N.Y.-Pittsburgh, south	16
Challenger	Salt Like-Denver	3	Denver-Billings	3
C & S	Chicago-St. Louis	6	Memphis-Little Rock	6
Colonial	New York-Montreal	15	Syracuse-Washington	4
Continental	Denver-Kansas City	5		
Delta	Atlanta-Dallas	9	Chicago-Miami	4
Eastern	New York-Washington	36	New York-Miami	16
Mid-Cont.	Minn.-Kansas City	10	Kansas City-Omaha	8
Monarch	Denver-Durango	2	Salt Lake-Grand Junc.	2
National	New York-Miami	10	Jacksonville-N. Orleans	5
Northeast	Boston-New York	20		
Northwest	Chicago-Minneapolis	14	Minneapolis-Milwaukee	12
PAA—(Latin Div.)	Miami-Havana	8	New York-San Juan	6
Robinson	Ithaca-New York	5	Binghamton-Buffalo	3
Southern	Atlanta-Memphis	2	Atlanta-Jacksonville	2
Trans-Texas	Houston-Dallas	3	San Angelo-Dallas	3
TWA (Dom.)	New York-Pittsburgh	21	Dayton-Columbus, O.	16
United	San Fran.-Los Angeles	20	New York-Chicago	14
Wis.-Cent.	Chicago-Milwaukee	8	Milwaukee-Madison	5

* Based on replies to AMERICAN AVIATION's survey of all airlines.

FASTEST... FINEST



NORTHWEST *Stratocruisers*

COAST TO COAST

and to

HAWAII

LOWER LEVEL LOUNGE—

ONE OF THE MANY LUXURY FEATURES OF NORTHWEST'S STRATOCRUISERS

NORTHWEST

Orient AIRLINES

FINEST COAST TO COAST

OVERNIGHT TO HAWAII... SHORTEST TO THE ORIENT

U. S. Airline Fleet

- *Domestic . . . 864*
- *International . . . 522*

Scheduled Domestic Service

Operator	Douglas DC-6	Douglas DC-4	Douglas DC-3	Lockheed 749	Lockheed 649	Lockheed L49	Lockheed 18	Martin 10A	Martin 202	Boeing 377	Boeing 307	Convair 240	Total
American	49	18	..	..	..	..	..	..	..	..	..	73	140
All American	..	..	11	..	..	..	..	..	..	..	..	..	11
Bonanza	..	..	4	..	..	..	..	..	..	..	..	..	4
Braniff	6	9	15	..	..	..	..	..	..	..	..	..	30
Capital	..	25	23	..	..	..	..	..	..	..	..	..	48
Challenger	..	..	5	..	..	..	..	..	..	..	..	..	5
C & S	..	6	12	..	..	..	..	..	..	..	..	..	18
Colonial	..	3	12	..	..	..	..	..	..	..	..	..	15
Continental	..	..	9	..	..	..	..	..	..	..	..	5	14
Delta	6	6	20	..	..	..	..	..	..	..	..	..	32
Eastern	..	18	51	7	13	..	..	..	..	..	..	..	89
Empire	..	..	4	..	..	..	..	..	..	..	..	..	4
Mid-Continent	..	..	20	..	..	..	..	..	..	..	..	..	20
Monarch	..	..	5	..	..	..	..	..	..	..	..	..	5
National	4	9	..	..	..	..	11	..	..	..	..	..	24
Northeast	..	1	8	..	..	..	..	..	..	..	..	5	14
Northwest	..	18	2	..	..	..	..	..	24	10	..	..	54
Piedmont	..	..	8	..	..	..	..	..	..	..	..	..	8
Pioneer	..	..	11	..	..	..	..	..	..	..	..	..	11
Robinson	..	..	4	..	..	..	..	..	..	..	..	..	4
Southern	..	..	5	..	..	..	..	..	..	..	..	..	5
Southwest	..	..	9	..	..	..	..	..	..	..	..	..	9
Trans-Texas	..	..	10	..	..	..	..	..	..	..	..	..	10
TWA	..	13	61	12	..	23	..	..	..	..	5	..	114
Turner	..	..	2	..	..	..	..	..	..	..	..	..	2
United	39	28	69	..	..	..	..	..	..	..	..	..	136
West Coast	..	..	6	..	..	..	..	..	..	..	..	..	6
Western	..	6	9	..	..	..	..	..	..	..	..	10	25
Inland	..	..	1	..	..	..	..	..	..	..	..	..	1
Wisconsin-Cen.	..	..	..	..	..	..	..	6	..	..	..	..	6
TOTAL	104	160	396	19	13	23	11	6	24	10	5	93	864

Source: AMERICAN AVIATION Survey

Scheduled International Service

Operator	Douglas DC-6	Douglas DC-4	Douglas DC-3	Lockheed 749	Lockheed 649	Lockheed L49	Martin 202	Boeing 377	Convair 240	Grumman G21A	Total
Alaska	..	..	3	..	..	..	..	..	..	..	3
Alaska Coastal	..	..	..	..	..	..	..	..	..	4	4
American	*49	*18	..	..	..	..	..	..	*73	..	140
American Overseas	..	6	1	..	..	7	..	10	..	..	24
Braniff	*6	*3	1	..	..	..	..	..	..	..	10
Caribbean Atlantic	..	..	3	..	..	..	..	..	..	..	3
C & S	..	*6	*12	..	..	..	..	..	..	..	18
Colonial	..	*3	..	..	..	..	..	..	..	..	3
Eastern	..	*18	..	*7	*13	..	..	..	..	..	38
Ellis	..	..	..	..	..	..	..	..	..	6	6
Hawaiian	..	..	12	..	..	..	..	..	..	..	12
National	*4	*9	..	..	..	..	..	..	..	..	13
Northern Cons.	..	..	3	..	..	..	..	..	..	..	3
Northwest	..	*18	*2	..	..	..	*24	*10	..	..	54
Pacific Northern	..	1	3	..	..	..	..	..	..	..	4
Panagra	6	2	11	..	..	..	..	..	..	..	19
PAA—Atl. Div.	..	47	1	..	..	14	..	9	..	..	71
PAA—Lat.-Amer. Div.	..	..	9	..	..	..	..	..	20	..	29
PAA—Pac.-Alas. Div.	..	16	..	..	..	..	..	11	..	..	27
Trans-Pacific	..	..	5	..	..	..	..	..	..	..	5
TWA	..	*10	..	*12	..	..	..	..	..	..	22
United	*9	..	..	..	..	..	..	8	..	..	14
Wien Alaska	..	..	2	..	..	..	..	..	..	..	2
TOTAL	74	157	68	19	13	21	24	48	93	10	527

* Also listed on Domestic Certificate.

Source: AMERICAN AVIATION Survey

Now for the first time...

The fastest and most modern air coach service ever offered

AMERICAN'S DC-6 AIR COACH

The only scheduled DC-6 air coach service

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AMERICAN AIRLINES INC.

AMERICA'S LEADING AIRLINE

American Aviation salutes . . .

Ten Top Pilots

THE AIRLINE pilot is a man with a full time job that each year calls for more skill than in the preceding year. The ever increasing speed of modern transport aircraft and the advances made toward all-weather flying find their focal point in the cockpit. In the final analysis, regardless of aids, the pilot bears the responsibility for important decisions every day.

Each year there are some pilots who manage their every day affairs in a fitting manner and still find time to delve into related problems the solutions to which contribute to the well being of the industry and the safety of flying.

From nominations submitted by the airlines, AMERICAN AVIATION has selected 10 pilots who are representative of this progressive attitude among airline pilots. In citing the accomplishments of this group, AMERICAN AVIATION extends its tribute to all the men who fly the airways of the U. S. and of the world.

Capt. Ernest A. Cutrell
American Airlines

All-Weather Flying

Captain Ernest A. Cutrell is probably the best qualified pilot in the world today in the highly controversial field of high intensity approach and runway lighting. For years Cutrell has devoted many hours of his own time and taken his life in his hands to obtain basic data which have already had a major influence in shaping lighting standards.

In recent years Cutrell has been the Aid Line Pilots Association's representative in all matters pertaining to this field of development. He takes time off from his duties as a line pilot flying schedules out of New York to participate in the operational tests and frequent meetings in which tomorrow's lighting standards are being shaped.

JATO

Captain R. V. Carleton, director of flight operations for Braniff Airways, is responsible for the flight test program which culminated in the first CAA approval for the use of Aerojet JATO for assisted take-off of commercial transports. Carleton administered a special project at La Paz, Bolivia, designed to provide data on which to gain approval of assisted take-off from the La Paz Airport, 13,398 feet above sea level. Carleton laid out the necessary test program, worked out administrative details with CAA, Aerojet and other interested parties and flew the Douglas DC-4 airplane during the test runs.

The availability of JATO for emergency assistance during take-offs at this critical altitude permitted the introduction of four-engined equipment where it would otherwise have been impossible. There is no question that the use of JATO for similar operations will open many airports to economical service by large transports.

Capt. R. V. Carleton
Braniff Airways

Capt. W. E. Rhoades
United Air Lines

RTCA

Captain W. E. "Dusty" Rhoades has been a major figure in the development of air navigation and traffic control systems for the United States. On loan to the Air Transport Association for almost three years, Rhoades was in charge of coordinating the airline industry's interests in the Radio Technical Committee for Aeronautics program.

Rhoades is with United once more, in charge of the company's engineering test section at San Francisco. Meanwhile the work which he aided in formulating, even prior to his association with ATA, is getting underway and the industry is beginning to reap the benefits of his contributions.

Training

Captain James D. O'Neal made valuable contributions to the science of crew training through his work with the Dehmel trainer. The Curtiss Wright-built Dehmel trainer is a marvel of post war science but much of its value is dependent upon the manner in which it was applied to the specific problem of crew training.

O'Neal, as assistant chief pilot in charge of training, prepared the transitional program for training PAA pilots for the Boeing Stratocruiser. His Dehmel and aircraft syllabus is largely responsible for the degree of success which has been achieved with

SIKORSKY Helicopter NEWS

SIKORSKY AIRCRAFT
ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION
BRIDGEPORT CONNECTICUT

It was only ten years ago that this country's first helicopter, the Sikorsky VS-300, made aviation history by rising a few inches off the ground. It carried only one man - Igor Sikorsky. But it was the beginning of a story of leadership, of pioneering in a new field.

Now, just ten years later, the newest and largest of a long line of successful Sikorsky helicopters has completed its flight tests and is now in production. Designated the H-19 for the Air Force, this latest helicopter can carry ten passengers (or eight litter patients) plus a crew of two.

In addition to the traditional Sikorsky ruggedness, it combines many important advances in helicopter performance, dependability, maintenance and ease of handling on the ground and in the air.

Known commercially as the S-55, the craft has a top speed of well over 100 miles per hour and a service ceiling of about 13,000 feet. With auxiliary tanks, it has a ferry range of approximately 1,000 miles.

Constant pioneering in research and development work brought this latest helicopter to the production line at Sikorsky Aircraft. And this is still only the beginning. The pioneering goes on and on.

SIKORSKY AIRCRAFT

Bridgeport, Connecticut

Capt. James D. O'Neal
Pan American Airways

Capt. Ralph Sewell
Capital Airlines

Capt. Charles B. Kesselring
Los Angeles Airways

the flight simulator. Not only has this program made it possible to check out green crews but it has been approved in lieu of flight time for certain phases of the regular pilot checks.

Charter Service

Captain Ralph Sewell has been the captain on flights by Capital Airlines around the world during 1949, to Bombay and return, to Rome, Oslo, and to London. On his own time and under his own initiative, Sewell studied the problems and procedures of routes, weather facilities, airports, radio facilities and ocean navigation applicable to such an operation. He also made a round-the-world flight as a crew member of another airline to verify his studies.

The resulting flights which Sewell's studies made possible for Capital grossed over $120,000 during 1949, over 20% of the total charter business conducted by the airline.

Helicopters

Charles B. Kesselring has logged over 2,600 hours as a helicopter pilot and recently chalked up his 60th hour of instrument flying in the Sikorsky S-51 helicopter used over Los Angeles Airways routes. As a result of his work, first instrument approval for helicopter flight was given LAA by CAA last month.

Kesselring pioneered scheduled helicopter flying at night, developed navigational aids for night flying, established a master pilot training program and generally worked out procedures where none had previously existed.

Public Relations

Captain Orville H. Handy made the most out of a routine assignment. The National Foundation for Infantile Paralysis hired a Slick C-46 to carry a real covered wagon across the country in a 27-day tour of 25 cities, collecting contributions for the "March of Dimes" campaign.

Instead of merely filling his assignment, Handy appeared on radio shows, participated in newspaper interviews, helped out on publicity, met and impressed hundreds of people and, when necessary, rolled up his sleeves and went to work on any job to make the operation a smoother one. On his return to the home base, he prepared a report which will serve as a useful guide in future operations of this general type.

Navigation

UAL Capt. E. B. Jeppesen turned a hobby into a profitable business. His interest in navigation and instrument weather flying led him to compile authoritative data on airway routes, radio range facilities, let down procedures, etc. Interest in his airways information led him to establish what is now a going business, publishing the material for general use.

Today the Jeppesen "Airways Manual" is in widespread use by com-

New Home for 20-Year-Old ALPA— New headquarters for the Air Line Pilots Association is being constructed on the northwest corner of 55th Street and Cicero Avenue, Chicago, Ill., at cost of approximately $350,000. ALPA passed the 20th anniversary of its founding on April 1.

Capt. Orville H. Handy
Slick Airways

Capt. E. B. Jeppesen
United Air Lines

mercial, military and civil pilots. Jeppesen's active knowledge of the piloting problems manifested itself in the style and format of the manual which is now contributing so much to easing the pilot's workload in the cockpit.

Cargo Service

Captain Victor A. Wright is responsible for the successful development of Pan American's "Cargo Corps." Given a fleet of 10 Curtiss C-46's, and little else, Wright rounded up 15 two-man crews, trained them in every phase of international cargo operations. These crews have logged 18,500 hours and some 3,700,000 plane miles without an accident.

Wright has personally designed new ramps for loading jeeps into the C-46, new stanchions for facilitating shipment of cattle, and prompted studies which resulted in a 3,000-pound increase in the payload of the C-46. The Cargo Corps operation is paying off and expanding. PAA is now checking out additional pilots to bring the corps up to 40 men.

Research

Captain Joe Toth was concerned about the occurrence of fires in the landing gear wheels while the airplane was being taxied. Once started, these fires spread to the wing structure and consequently into a fuel tank danger area. Toth suggested to the company that tests might be conducted to determine the engine power required to provide adequate propeller blast to prevent the fire spreading.

As a result, through the cooperative efforts of the EAL engineering department, ATA and CAA, tests were conducted at Indianapolis which established definite procedures toward this end.

Capt. Victor A. Wright
Pan American Airways

Capt. Joseph Toth
Eastern Air Lines

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model ADF-12

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INCREASED SENSITIVITY
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An automatic direction finder that will meet the performance standards of an airline, and yet be light enough, practical enough, and inexpensive enough to suit the needs of the man who flies his own plane. That was the high goal the Lear engineers had set for themselves in designing the new Orienter model ADF-12.

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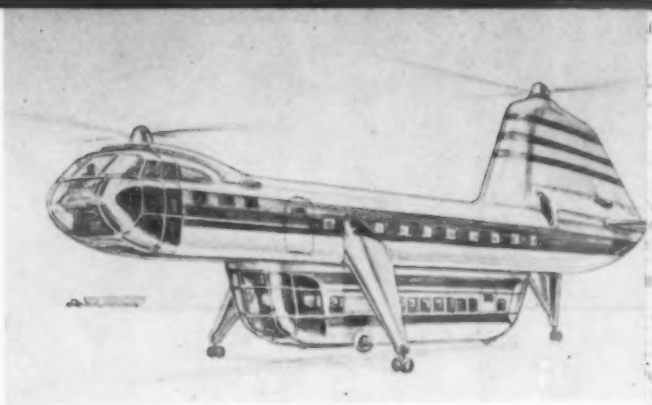
Canadian General Electric Company, Limited, Toronto, Canada

Passenger Helicopter Service . . .

Sikorsky H-19



Piasecki XH-16

. . . how soon?

THE OPERATING experience of the two scheduled helicopter mail services during 1949 (see page 68) combined with new military interest to make the helicopter a promising possibility for passenger carrying operations in the near future. Development cost of a practical passenger carrying helicopter has been the chief obstacle to advances in this field in past years.

During 1949 the military services were seeking a helicopter suitable for carrying a number of stretcher cases. The same military requirements these rotorcraft would have to meet would be directly applicable to helicopters for passenger carrying operations.

The four most promising entries in this military field were the Piasecki H-21, the Sikorsky H-19, the Bell YH-12 and the McDonnell Model 65. The passenger carrying capacity of these ships would be 21 for the Piasecki, 10 for the Sikorsky, 12 for the Bell and approximately 15 for the McDonnell, although no official figure has been set on the latter model. Early in 1950 Piasecki received a $10 million production order for about 25 of the H-21's.

It's been estimated that commercial models of these passenger carrying helicopters would cost in the range of $150-200,000, providing a military production line took care of basic development costs.

Sales Value of Speed

The helicopter developments came at an unusually apt time. The airlines are now faced with the decision as to the sales value of higher speeds. There is no question that jet transports are coming nor that they will offer sizable increases in cruising speeds. But jet transports will cost considerably more than present-day reciprocating engine planes and there is serious thought that a premium fare may be necessary to justify the economics of faster flight.

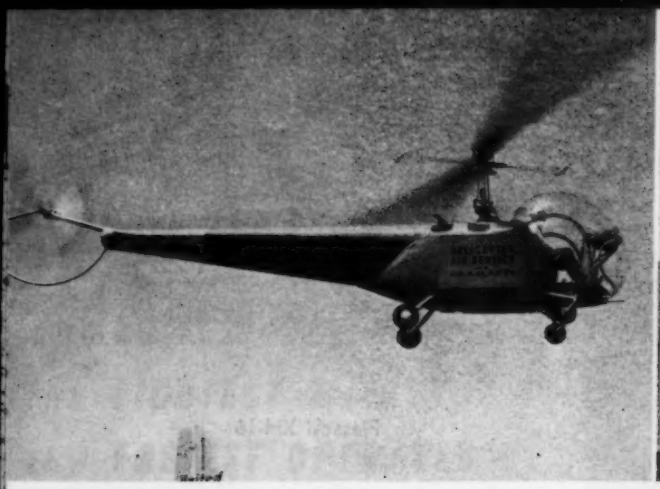
Where does the helicopter fit in? It's this simple: cruising speed is not block speed. It requires extremely long flight segments to make the block speed of jet transports approach the cruising speed. There are those who feel that reasonable improvements in commuting times between the city and the airport, via the helicopter, would actually bring about greater block speed than even greater increases in top cruising speeds.

A recent paper by Charles Froesch, Eastern Air Lines' chief engineer, emphasizes the economics of helicopter service. Talking before the Institute of the Aeronautical Sciences last month, Froesch stated that for distances up to 180 miles the helicopter is faster than present-day transports.

The accompanying charts, presented by Froesch, provide multiple examples of how the helicopter would fit into feeder airline service. It might be added that Froesch estimated that a 25-30 passenger helicopter would cost about $350,000. This model would provide for about a 2,000-pound payload in addition to the passengers. Direct flight costs of this ship, said Froesch, would be about 4½c per seat mile, assuming no mail or cargo revenue but 100% load factor. This compares with 7-9½c per mile now being borne by passengers on the route segments shown.

How the Helicopter Rates for Feeder Service

FLIGHT	AIR MILEAGE (AIRPORT TO AIRPORT, MILES)	FLIGHT SCHEDULE TIME	BLOCK TO BLOCK SPEED, MPH	GROUND TRANSPORTATION MILEAGE	GROUND TIME	AVERAGE GROUND SPEED, MPH	TOTAL MILEAGE	AVERAGE OVERALL SPEED, MPH, AIRPLANE	HELICOPTER SPEED, MPH	AIR FARE (INCLUDING TAXI, LIMOUSINE, BUS OR CAB FARE	TOTAL COST	TOTAL MILEAGE (FROM TABLE)	OVERALL COST PER MILE TO PASSENGER
BALTIMORE - WASHINGTON	40	22'	109 MPH	11	1h15'	8.8	51	32	76	$2.88	$2.05	$4.93	51	$0.0966
CHICAGO - MILWAUKEE	82	35'	141 MPH	16.5	1h25'	11.7	98.5	50	78	$5.69	$2.00	$7.69	98.5	.077
NEW YORK - PHILADELPHIA	96	40'	144 MPH	17	1h10'	14.6	113	57	79	$6.73	$2.35	$9.08	113	.0805
HARTFORD - NEW YORK	101	43'	151 MPH	22.5	1h10'	19.3	123.5	66	79	$6.55	$2.25	$8.80	123.5	.0712
DETROIT - CLEVELAND	105	40'	158 MPH	45	1h55'	24	150	58	80	$7.48	$2.65	$10.13	150	.0675
CHICAGO - INDIANAPOLIS	162	54'	180 MPH	18.75	1h40'	11.3	180.75	71	80.5	$11.50	$2.40	$13.90	180.75	.0769



Bell 47D—Helicopter Air Service started scheduled mail service with six Bell 47D helicopters on August 20, 1949. At the end of the year it had flown 72,433 revenue plane miles and carried 3,424 ton-miles of U. S. air mail.

Sikorsky S-51—Los Angeles Airways has been operating the S-51 helicopter on scheduled air mail routes around Los Angeles since October 1, 1947. In 1949 LAA flew 339,425 revenue plane miles and 42,313 revenue ton miles.

L. A. Airways Proves Helicopter's Value

By FRED HUNTER

HAVING pioneered the transportation of air mail by helicopter, Los Angeles Airways is now ready to pioneer the scheduled transportation of passengers by the same vehicle.

It has told the CAB just to say the word.

Within the two and a half years of its operation, Los Angeles Airways has written a new chapter in the development of air transportation. Not only is it a successful chapter, but it is rather an amazing one. The experience of Los Angeles Airways is a yardstick by which the potential of rotary wing aircraft may be evaluated.

The future looks promising. To Clarence Belinn, the carrier's president, rooftop pickup and delivery of passengers is just around the corner.

Public Benefits

Los Angeles Airways has no difficulty in demonstrating the substantial public benefit that has resulted from the helicopter air mail service.

For the full year of 1949 Los Angeles Airways carried 4,310,775 lbs. of air mail and air parcel post as compared to 2,573,608 lbs. in 1948.

Ton-mile cost to the government of the helicopter experiment has maintained a consistent downward trend. It ranks low among the feeders in this respect.

National average of the per ton-mile cost of carrying mail by all the feeder carriers in the United States as set forth in the CAB's reports for the third quarter of 1949 was $33.07. In that same quarter, the per ton-mile revenue of Los Angeles Airways was $10.78. This represented a reduction from approximately $15 for the initial month, October, 1947, and from $11.88 per ton-mile for the third quarter of 1948.

Costs Go Down

Similarly Los Angeles Airways' operating costs maintained a consistent downward trend in the same periods. These operating costs decreased from $20 per ton-mile for the initial month, October, 1947, to $11.18 for the third quarter of 1948 and to $10.45 for the third quarter of 1949.

From virtually a standing start—since no one ever before had established any records of experience in daily scheduled operation—the west coast helicopter carrier has made marked progress technically. It has increased overhaul time on the P & W Wasp Juniors, as applied to helicopter operations in the Sikorsky S-51's—from 600 hours to 900 hours and will have it up to 1,000 hours soon. Gearbox time has been boosted from 400 hours to 480 hours, a notable 20% increase.

Major overhaul of the S-51's, which had been arbitrarily set at 2,000 hours for the simple reason no helicopter in the world had ever been flown anywhere near that long and no one knew exactly where to draw the line, has been nudged up gradually as the mail machines accumulated time. One of the company's five S-51's is now approaching 3,000 hours; all except one have passed 2,000 hours.

Conventional airport lighting methods were out of the question for the heliports used by Los Angeles Airways because of expense. Installation of boundary lights, for example, would have cost about $3,000 each. Los Angeles Airways put "boundary lights" on the fence posts of its heliports at approximately 10c per post by the simple expedient of pasting patches of Scotch lite on the posts. When an approaching helicopter threw its landing lights on a heliport the Scotch lite reflected back to etch out the boundary markers in sharp relief.

Unique Beacon

Cost of a revolving beacon to identify a heliport would also have been prohibitive. Los Angeles Airways solved this problem for about 15c a landing—just stuck a railroad fusee in a sawed-off barrel of sand and touched it off 10 minutes before a helicopter was scheduled to arrive. Its red flare made a perfect identifying beacon for the pilot. The fusee was ignited by the postoffice messenger transporting the mail back and forth between the heliport and the community postoffice. After the helicopter was on its way, the messenger doused out the fusee in the sand.

Los Angeles Airways' temporary three-year certificate expires next October. It has applied for an extension of this certificate and in this application it has asked the certificate be made to include the transportation of passengers to all points on its Route 84. This broadening of the certificate, the carrier declares, will answer a substantial public demand for this type of service in the Los Angeles area.

Specialized Craft Serve Transport Need

MORE THAN any previous year, 1949 marked a growing diversity in the requirements of air transportation. For some time the real scheduled transport service by air has been taken care of by multi-engine conventional airplanes. With a few exceptions, air express and cargo were generally handled in the limited baggage compartment areas. And the industry seemed content to let passengers from outlying towns make their way to the airport via ground transportation.

The CAB approval of single-engine aircraft for feeder line operations starting in 1949 extended the field of service which the scheduled air services can offer the flying public. Airports unfitted to multi-engine transports can now be served with some degree of economic justification.

As can be seen in the accompanying chart, the airplanes immediately adapted to this new type of service were the Beech A-35 Bonanza, the Cessna 190 and Cessna 195. The same relaxation of requirements which enabled these planes to enter scheduled services was accompanied by the introduction of the Cessna T-50 into service in New England. This is a twin-engine airplane being operated with only one crew member.

The certification of four all-cargo carriers for scheduled operation also marked an extension of service. As can be seen from the accompanying chart, the new service will be operated for the time being with existing passenger aircraft converted to full cargo usage. But the introduction of all-cargo service on this scale is expected to provide the incentive for development which will eventually bring about a demand for cargo airplanes. While all-cargo airplanes, such as the Douglas DC-6A Liftmaster, have been offered to the airlines, by year's end no orders had been placed.

Specialized Air Carrier Aircraft
Domestic Service

OPERATOR	Douglas DC-4	Douglas DC-3	Curtiss C-46	Sikorsky S51	Bell B47D	Cessna 195	Cessna 190	Cessna T50	Beech A35	Total
HELICOPTERS										
Helicopter Air Service	..	..	..	..	6	..	..	..	..	6
Los Angeles Airways	..	..	..	5	..	..	..	..	..	5
CARGO (ONLY)										
Airnews, Inc.	..	2	..	..	..	..	..	..	..	2
Flying Tiger Line	8	1	5	..	..	..	..	..	..	14
Slick Airways	..	..	18	..	..	..	..	..	..	18
U. S. Airlines	..	..	5	..	..	..	..	..	..	5
LOCAL SERVICE										
Central Airlines	..	..	..	..	..	..	..	..	11	11
Mid-West Airlines	..	..	..	..	..	..	7	..	..	7
Purdue Aeronautics	..	..	..	..	..	3	..	..	..	3
Wiggins Airways	..	..	..	..	..	..	..	4	..	4
TOTALS	8	3	28	5	6	3	7	4	11	75

Source: AMERICAN AVIATION Survey

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Overhaul Gains Bring Direct Savings

. . . engine, propeller, instrument periods stretched

WHEN United Air Lines introduced its tailored maintenance docks for the Douglas DC-6, it was noticed that the man-hours required to accomplish a given job were generally increased. Investigation proved that mechanics who previously worked fast to finish a job while working from the top of a ladder were now relaxing and using more time.

Each solution brings with it its own problems, especially in the field of airline maintenance. But during 1949 the airline maintenance departments made major improvements which were reflected in the year-end profit statements. Typical of these improvements were the increases in authorized overhaul periods for aircraft, aircraft engines, instruments and other accessories.

As can be seen on the accompanying chart, engine overhaul times are on the way toward doubling their pre-war and even early post-war periods. For many years the airlines felt that there might be a time limit after which the engine would be incapable of developing the required horsepower even though the engine appeared mechanically sound.

In 1949 Northwest Airlines, the line with the longest approved overhaul periods, removed an engine from a Douglas DC-4 after it reached its overhaul period, packaged it and sent it back to Pratt & Whitney where it was tested on a dynamotor. The test showed that the engine, after its full period in the airplane still developed power within the factory tolerances for brand-new engines.

Major Cost Reduction

Working with the CAA safety agents in the field, the airlines are now generally using this assumption. Within the framework of each airline's own operating problems, there appears to be no fixed limit which can be established. While doubling the overhaul times does not halve the overhaul costs, it does bring about a major reduction. In addition to direct savings in overhaul man-hours expended per hour of flying, it also produces savings by reducing the number of spare engines which must be owned by the airline.

As can be seen on the chart, some airlines are considerably out in front in the move to higher overhaul times. In some cases this reflects the overhaul and maintenance facilities of the airlines but less tangible factors, such as the route segment lengths and consequent number of landings and take-off per hour of flight, are also present in the final determination.

Note that all but 11 of 26 operators using the P & W S13G have over

Engine Overhaul Periods in Hours

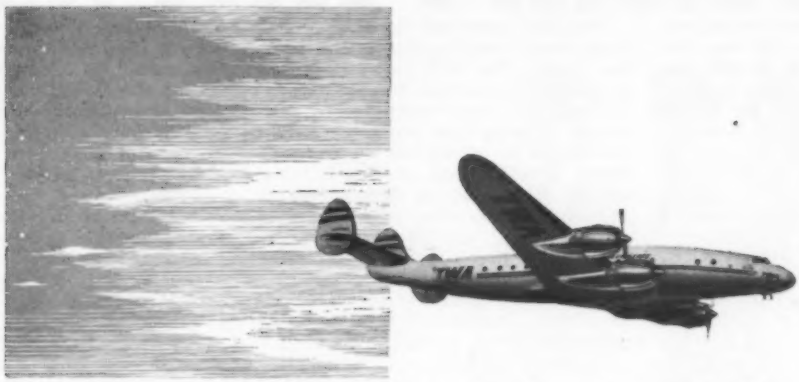
For U. S. Air Carrier Aircraft in Scheduled Operation

As of March 1, 1950

	Pratt-Whitney							Wright				
OPERATOR	S1C3G	S4C4G	2000-7	-9	-11	2SD13G	2800	TSB3G	G102	G-202A	BA-3	BD-1	Misc.
Alaska	900												
American				1100		1200	1200[1]						
All American	900												
Amer. Overseas	875			1000		1100					1100		
Braniff	1000	1000[2]	1200[3]				1000						
Capital			1000						1000[4]				
Carib. Atlantic		800							650[5]				
Challenger	900												
C & S				1100[6]						1150			1100[7]
Colonial					1100				1025				
Continental	1250						1000						
Delta				1100[8]			1000[9]			1200			
Eastern						1200[10]				1100		1025	
Empire	950												
Hawaiian	1000												
Los Angeles													1000[11]
Mid-Continent	1150												
Monarch	900												
National						1100[12]	900[13]			1050			
Northeast	1000		1000				1000[14]						
Northern Cons.	800								700				
Northwest	1000					1500	1200[15]	900					
Pac.-Northern	1000		850										
Panagra	1000					1000	1000[16]						
PAA-Atl. & LA	1100					1100	900[17]	600-1000			1000	1000	
PAA-Pac. & Alas.	1100			1300	1300	1300		600-1000[18]					
Piedmont	800												
Pioneer		1000											
Robinson									800[19]				
Southern	800												
Southwest	1000												
Trans-Pacific	950												
Trans-Texas	1000	700							700				
TWA	1500			1300	1100	1100				1500	1100	1200	1350[20]
United	1100				1200		1100[21]	600-1000					
West Coast	950												
Western	1200				1000	900	1000[22]						
Wien Alaska		700											
Wisc.-Central													800[23]

[1] 1000 hrs., CV-240. [2] S3C4G. [3] 7M1 & 7C. [4] G-102A. [5] G-102-A. [6] -M3. [7] WAC-9HD1. [8] -M3. [9] CA15. [10] Model D-5. [11] P&W R-985-P4. [12] -DC3. [13] CA15. [14] CA18. [15] CA18. [16] Model -CA15A. [17] 700 hrs. CV-240. [18] Sliding Scale. [19] Same for G102A. [20] Wright G-205A. [21] CA18. [22] CA18. [23] P&W R-985.

Source: Civil Aeronautics Administration



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1,000-hour overhaul times authorized. Also 24 of the possible 26 time increments for the P & W R-2100 engines are over 1,000 hours and one is up to 1,500 hours. Nine of the eleven R-2800 operators also have time increments of 1,000 hours or over. In almost every instance at least 100 hours of this time was gained during 1949 and in some instances more.

Avoids Flight Tests

The Wright engines show up equally well with 19 of 25 possible periods set at 1,000 hours or over. The policy of changing one engine at a time on four-engine equipment, so as to eliminate the flight tests otherwise required, has combined with longer overhaul periods to reduce engine change costs appreciably.

Propeller overhaul times have also made major strides during the postwar years. The fact that one airline is actually authorized to operate propellers 4,200 hours between overhauls would indicate that propellers might eventually be among the on-condition items. The fact that an item is taken off the list requiring fixed overhaul times does not mean it will not be pulled from service prior to a mechanical break-down. Most of the airlines establish their own overhaul times for on-condition items to reflect their individual operating experience. This is a much more flexible and useful method.

Instrument Overhaul

While it would be difficult, if not impossible, to list the improvements in the overhaul times of instruments during 1949, there have been sharp increases. An AMERICAN AVIATION survey shows that most of the airlines have increased overhaul times on 50-75% of their instruments by approximately 500 hours as compared with previous years.

During 1949 a number of airlines raised their aircraft overhaul periods 2,000 hours and an even greater number added at least 1,000 hours to earlier periods. The true significance of this can best be realized by considering that with a daily utilization of six hours it takes an airplane a full year to add 2,190 hours flight time. It might well be said that improvements in aircraft overhaul times during 1949 in some instances gave airlines a free year of flight, insofar as

Propeller Overhaul Periods in Hours

For U. S. Air Carrier Aircraft in Scheduled Operation

As of March 1, 1950

OPERATOR	HS, DC-3 23E50 6133A#	HS, DC-3 33D50 6495A#	HS, DC-4 23E50 6507A#	HS, DC-6 43D60 6851A#	HS, L-049 33E60 6801#	CW, L-749 C632S# 850-4C2#	HS, CV-240 23260 2H17#	CW, CV-240 C632S 740-6C2#	HS, B-377 23260 2J17B3	Misc. Model Props	REMARKS
Alaska	1200	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Alaska Coastal	.....	.....	.....	.....	.....	.....	.....	.....	.....	1000*	*HS, 2D30/6095, Grum. G-21A
All American	1800	.....	.....	.....	.....	.....	.....	.....	.....	.....	
American	.....	1650	2400	.....	.....	.....	.....	2000	.....	2400*	*CW, C632S/744-6C2, DC-6
Amer. Overseas	1750	.....	2200	.....	2200	.....	.....	.....	.....	600*	*CW, C644S/1052-20C4, B-377
Braniff	2400	.....	2200	1000	.....	.....	.....	.....	.....	.....	
Capital	3000	.....	2000	.....	.....	.....	.....	.....	.....	.....	
Carib.-Atlantic	1600	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Challenger	1800	.....	.....	.....	.....	.....	.....	.....	.....	.....	
C & S	2200	.....	2200	.....	.....	.....	.....	.....	.....	.....	
Colonial	3300	.....	2200	.....	.....	.....	.....	.....	.....	.....	
Continental	2500	.....	.....	.....	.....	.....	1000	.....	.....	.....	
Delta	2500	.....	2000	1000	.....	.....	.....	.....	.....	.....	
Eastern	2200	.....	2400	.....	1025	.....	.....	.....	.....	.....	
Ellis	.....	.....	.....	.....	.....	.....	.....	.....	.....	1000*	*HS, 2D30/6095, Grum. G-21A
Empire	1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Hawaiian	2000	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Mid-Continent	2300	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Monarch	1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	
National	.....	.....	2200	900	.....	.....	.....	.....	.....	2100*	*HS, 23E50/6139A, L-18-50
Northern Cons.	1600	1400	.....	.....	.....	.....	.....	.....	.....	.....	
Northeast	2000	.....	2000	.....	.....	.....	.....	1600	.....	.....	
Northwest	2000	.....	4200	.....	.....	.....	.....	.....	900	1100*	*HS, 23260/2H17F3, M-202
Pacific-Northern	2000	.....	1700	.....	.....	.....	.....	.....	.....	.....	
Panagra	2000	.....	2000	2000	.....	.....	.....	.....	.....	.....	
PAA System	2000	.....	3900	900	2000	1600	700	.....	600	.....	
Piedmont	1600	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Pioneer	.....	2000	.....	.....	.....	.....	.....	.....	.....	.....	
Robinson	1600	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Southern	1600	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Southwest	2000	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Trans-Pacific	1950	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Trans-Texas	2000	1600	.....	.....	.....	.....	.....	.....	.....	.....	
TWA	2800	2800	3000	.....	2400	2000	.....	.....	.....	.....	
United	3300	.....	3600	2200	.....	.....	.....	.....	.....	...	
West Coast	1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Western	3900	.....	3000	.....	.....	.....	1400	.....	.....	.....	
Wien Alaska	1400	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Wisc.-Central	.....	.....	.....	.....	.....	.....	.....	.....	.....	1200*	*HS, 22D30/618A, L-10-A

HS—Hamilton Standard Models CW—Curtiss-Wright Models #—Or equivalent models

Source: AMERICAN AVIATION Survey

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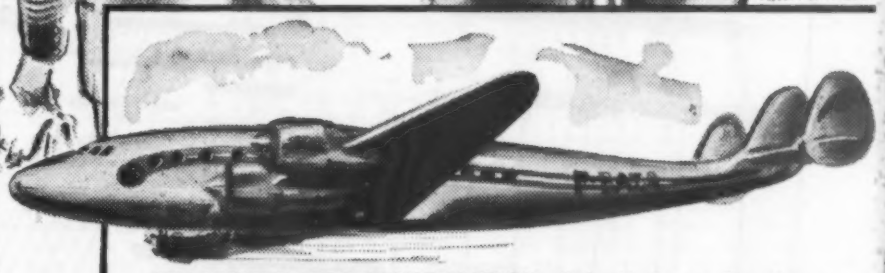

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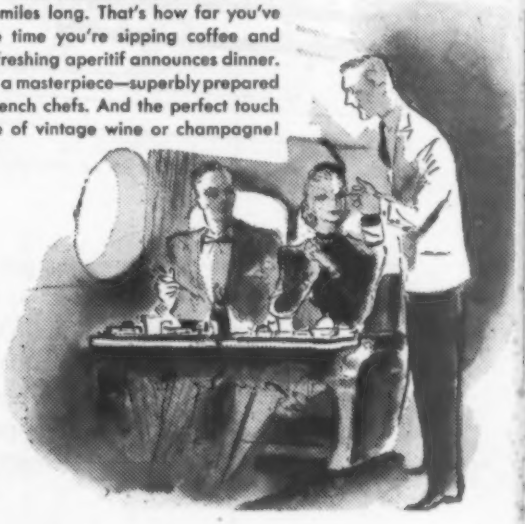

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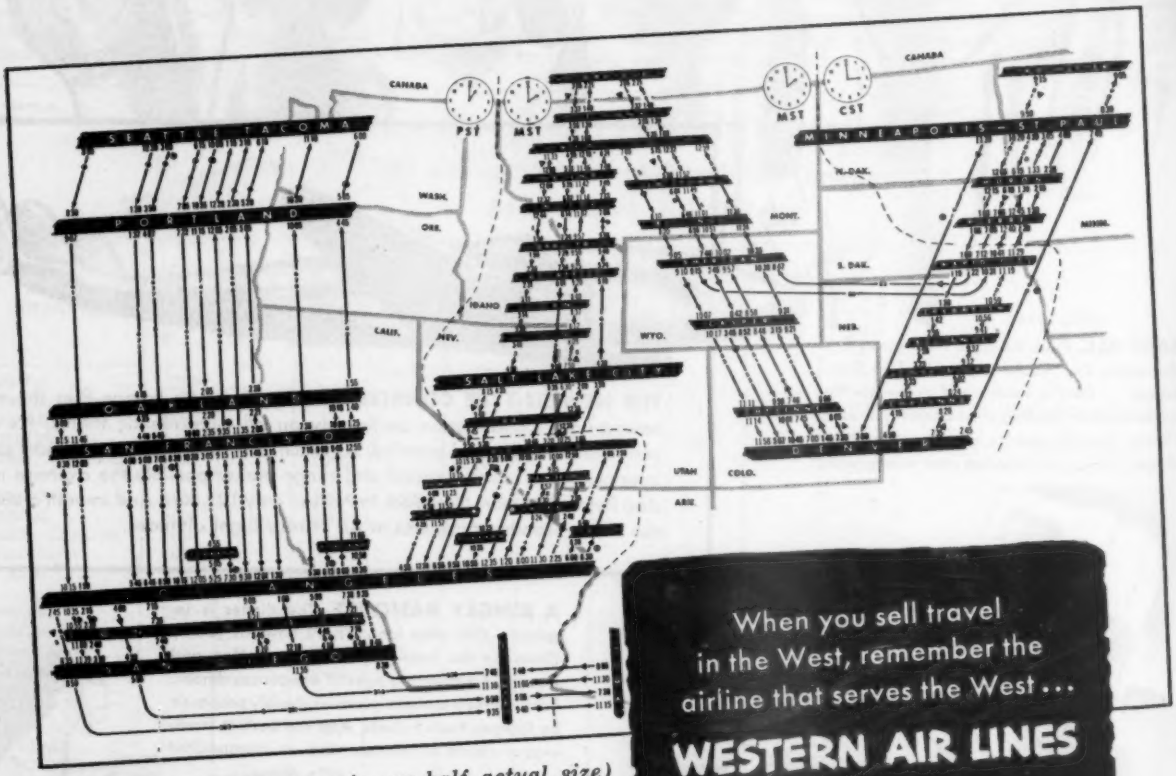

(Timetable shown above is one-half actual size)

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Proved Performance—During 1949 the reversible pitch propellers shown here, Curtiss (left) and Hamilton Standard made over 100,000 reversals during landing operations on commercial air transports. Their introduction in the postwar years provided substantially greater safety in landing operations by eliminating complications of wet or icy runways as a factor in stopping the aircraft. By year's end, despite the relatively short life of the reversible feature, the entire industry was citing the loss of this feature as a major obstacle to turbo-jet transports—aircraft which do not use propellers.

this expense item is concerned.

The move to progressive overhaul instead of periodic overhaul of aircraft during 1949 is an improvement which will have lasting effects on the industry. Working through ATA and CAA, the airlines have established progressive overhaul programs for the newer flight equipment which makes it unnecessary to ever remove an airplane from service for any appreciable period.

In pre-war days, and in some cases even now, airplanes were removed from service for periods up to 60 days to perform a 6,000 hour overhaul. Now the general increase in aircraft overhaul times and the assignment of many items previously set for the overhaul period to lesser periods has cut this out-of service time to six to 10 days. It is much easier for most of the lines to fit this type of equipment maintenance into the airline schedule pattern.

Some lines still find, however, that fixed overhaul periods on aircraft, as well as on items sometimes moved to on-condition status by other air lines, does not serve their purposes. Because of seasonal schedule requirements and varying shop work loads it is sometimes easier to handle aircraft in the earlier manner.

Both 1948 and 1949 were eventful years in the field of applied time studies. All of the larger airlines studied the fixing of given time increments for all types of maintenance work and consequently improved work scheduling throughout the year. Pan American at Miami and United Air Lines at Denver are probably the two outstanding examples of this trend.

1949 Transport Aircraft Direct Operating Costs

(In Cents Per Airplane Mile)

Editors Note: The data on direct operating costs shown below were compiled through a direct AMERICAN AVIATION survey of the airlines. The figures are interesting general comparisons but **should not** be used except as carefully weighed in the light of the operations of the respective airline including areas served, route structure, newness of equipment, new routes served, major equipment modifications and similar factors which sharply alter detail figures.

OPERATOR	Douglas DC-3	Douglas DC-4	Douglas DC-6	Convair Liner	Lockheed Constellation	Martin 2-0-2	Boeing 377	Lockheed Lodestar	Curtiss C-46
American	54.80¢	80.00¢	80.70¢	67.70¢	.....	.....	.....	.....	.....
Braniff	34.57¢	79.65¢	102.45¢	.....	.....	.....	.....	.....	.....
Capital	37.90¢	74.00¢	.....	.....	.....	.....	.....	.....	.....
Challenger	51.98¢	.....	.....	.....	.....	.....	.....	.....	.....
C & S	34.32¢	84.85¢	.....	.....	.....	.....	.....	.....	.....
Colonial	48.21¢	99.66¢	.....	.....	.....	.....	.....	.....	.....
Continental	32.89¢	.....	.....	61.10¢	.....	.....	.....	.....	.....
Delta	37.31¢	77.55¢	80.90¢	.....	.....	.....	.....	.....	.....
Eastern	35.44¢	73.27¢	.....	.....	122.90¢	.....	.....	.....	.....
Mid-Continent	35.32¢	.....	.....	.....	.....	.....	.....	.....	.....
Monarch	46.03¢	.....	.....	.....	.....	.....	.....	.....	.....
National	.....	77.82¢	84.58¢	.....	.....	.....	.....	35.08¢	58.33¢
Northeast	56.40¢	126.44¢	.....	63.99¢	.....	.....	.....	.....	.....
Northwest	39.60¢	59.92¢	.....	.....	.....	70.20¢	161.07¢	.....	.....
PAA—Lat.-Am. Div.	72.00¢	85.00¢	156.00¢	92.00¢	132.00¢	.....	.....	.....	66.00¢
PAA—Pac.-Alas. Div.	.....	96.87¢	.....	.....	177.55¢	.....	173.62¢	.....	.....
Robinson	124.00¢	.....	.....	.....	.....	.....	.....	.....	.....
Southern	54.92¢	.....	.....	.....	.....	.....	.....	.....	.....
Trans-Texas	80.73¢	96.87¢	.....	.....	.....	.....	.....	.....	.....
TWA-Domestic	37.00¢	.....	.....	.....	88.00¢	.....	.....	.....	.....
TWA-International	.....	115.00¢	.....	.....	145.00¢	.....	.....	.....	.....
United	45.30¢	88.40¢	.....	.....	.....	.....	.....	.....	.....
West Coast	47.40¢	.....	.....	.....	.....	.....	.....	.....	.....

NOTE: Wisconsin Central DOC for Lockheed 10-A's was 41.57c
Central Airlines DOC for Beech Bonanzas was 16.7c.
Mid-West Airlines DOC for Cessna 190's was 30.97c

Source: AMERICAN AVIATION Survey

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Radar Aids fo

IT'S DIFFICULT to predict what the effect of introducing a given piece of equipment into aircraft operations will be. Several years ago responsible industry representatives were claiming that the instrument landing system would not permit landings with lower operating minimums than those then in use, although it would be an aid to the pilot. Yet landing minimums have been almost halved since then, chiefly as a result of the ILS.

During 1949 there were major developments in the field of air navigation, traffic control and landing aids.

The ILS is now an accepted piece of

CAA's Planned Radar Installations

Precision Approach Radar

Pittsburgh	Covington
Philadelphia	Burbank
Detroit	Memphis
Kansas City, Mo.	Buffalo
Indianapolis	Oklahoma City
Seattle	Baltimore
Portland	Knoxville
Houston	Dayton
Dallas	Long Beach
San Francisco	Minneapolis
Newark	Fort Worth
Oakland	Harrisburg
St. Louis	Providence
Anchorage	Charlotte
Birmingham	Jacksonville
Nashville	Tulsa
New Orleans	San Antonio
Columbus	Charleston
Louisville	Milwaukee
Denver	Norfolk

Surveillance Radar

Birmingham	Mobile
Nashville	Spokane
Corpus Christi	Canton
Louisville	Richmond
Burbank	Amarillo
Buffalo	Chattanooga
Oklahoma City	Windsor Locks
Baltimore	Omaha
Knoxville	Wichita
Dayton	Toledo
Long Beach	Great Falls
Ft. Worth	Syracuse
Harrisburg	Fort Wayne
Providence	Greensboro
Charlotte	Albany
Montgomery	Greenville
Tulsa	Tampa
Charleston	Wilkes-Barre
Milwaukee	Little Rock
Austin	Augusta

In regard to the above installations it is worth noting that there is approximately two years' time lag between ordering of equipment and commissioning of the station for operational use. Interim changes in list are quite possible.

Improved Airline Operations

equipment and its use at 99 airports has been a major factor in the improving safety record of the airlines despite their operation in more marginal weather.

Use of GCA, as the airport radar system is called, has not met with complete acceptance by the airlines as yet but 1949 laid the groundwork which will see increasing acceptance this year. The reliability and accuracy of the newly installed Gilfillan systems should soon combine with improving traffic control knowledge to prove the equipment to be the indispensable aid which it ultimately will be. Forty-nine airport surveillance radar sets (see chart) are in engineering and construction stages and 22 precision approach sets are in progress. CAA has also released bids for additional units.

ILS Installation Schedule

REGION 1

Location	Earliest possible completion date	Location	Earliest possible completion date
New Castle, Del.	April, 1950	Baltimore, Md.	June, 1950
Charleston, W. Va.	April, 1950	Pittsburgh, Pa.	March, 1951
Atlantic City, N. J.	Dec., 1950	Rochester, N. Y.	Nov., 1950
Wilkes-Barre, Pa.	Oct., 1950	Allentown, Pa.	June, 1952
Wheeling, W. Va.	Dec., 1950	Bridgeport, Conn.	June, 1951
Albany, N. Y.	Oct., 1950	Harrisburg, Pa.	June, 1952
Burlington, Vt.	Oct., 1950	Providence, R. I.,	June, 1951
Binghamton, N. Y.	Feb., 1951		

REGION 2

Augusta, Ga.	Jan., 1951	Columbia, S. C.	Jan., 1951
Columbus, Ga.	Jan., 1951	Greensboro, N. C.	Nov., 1950
Greenville, S. C.	June, 1951	Mobile, Ala.	Nov., 1950
Macon, Ga.	Jan. 1951	Orlando, Fla.	June, 1951
Wilmington, N. C.	Dec., 1950	Savannah, Ga.	Feb., 1951
Pensacola, Fla.	Mar., 1951	Winston-Salem, N. C.	Dec., 1950
Chattanooga, Tenn.	Jan., 1951		

REGION 3

Lansing, Mich.	Jan., 1951	Flint, Mich.	Jan., 1951
Madison, Wis.	Jan. 1951	Youngstown, O.	Nov., 1950
Evansville, Ind.	Sept., 1950	Peoria, Ill.	Sept., 1951
Sault St. Marie, Mich.	Mar., 1950	Springfield, Ill.	July, 1951

REGION 4

Corpus Christi, Tex.	Nov., 1950	Shreveport, La.	May, 1951
Beaumont, Tex.	June, 1951	Abilene, Tex.,	June, 1951
Baton Rouge, La.	Oct., 1950	Lake Charles, La.	Nov., 1950
Lubbock, Tex.	Nov., 1950	Monroe, La.	Nov., 1951
San Angelo, Tex.	Jan., 1951	Laredo, Tex.	June, 1951
Ft. Worth, Tex.	Mar., 1951		

REGION 5

Joplin, Mo.	Nov., 1950	Casper, Wyo.	Jan., 1951
Colorado Springs, Col.	Nov., 1950	Huron, S. D.	Feb., 1951
Sioux Falls, S. D.	Dec., 1950	Pueblo, Col.	Mar., 1951
Quincy, Ill.	Dec., 1950	Sioux City, Ia.	Mar., 1951

REGION 6

Ontario, Cal.	Oct., 1950	Arcata, Cal.	Nov., 1950
Sacramento, Cal.	June, 1950	Burbank, Cal.	Not established

REGION 7

Medford, Ore.	June, 1951	Pendleton, Ore.	April, 1951
Bellingham, Wash.	Nov., 1950	Pocatello, Ida.	June, 1951
Everett, Wash.	Dec., 1950	Salem, Ore.	Nov., 1950
Great Falls, Mont.	Feb., 1951	Yakima, Wash.	July, 1951
Helena, Mont.	June, 1951		

REGION 8

Anchorage	Feb., 1951	Kenai	Dec., 1950
Fairbanks	Feb., 1951	Annette Is.	Dec., 1950
Yakutat	April, 1951	Northway	Jan., 1951
Nome	Jan., 1951	Naknek	Feb., 1951

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13,670 Tariff Filings Show . . .

Price Biggest Travel Factor

By William V. Henzey

IT BECAME significantly apparent last year that the domestic and foreign airlines were turning to the price of their product as the most important individual factor in developing traffic.

The fact was borne out by the tremendous increase in the number of tariff filings made with CAB which, when compared with the first post-war year of 1946, totaled approximately 500% more (See table).

Though inflated somewhat by the filings occasioned by the entrance of the freight forwarder, the total for fiscal year 1949 of 13,670, reflected substantial increases in filings by international and domestic certificated lines.

The international carriers have been experimenting on a large scale with seasonal fares and specific commodity rates and filed more tariffs in the process last year than did any other individual class of carriers, including the domestic certificated lines.

Individual Tariffs

Much of this is attributed to the fact that they publish local or individual publications, whereas the domestic carriers, for the most part, participate in consolidated tariffs which not only reduces the total number of filings, but results in substantial economies for the participants.

Currently, plans are underway to publish consolidated tariffs this year for the airline members of the International Air Transport Association. If and when filed, it is anticipated that a reduction in tariff volume will occur, and many of the lines will incur less tariff publishing expense.

By no means, however, does it have any relation to activity of the carriers in the rate field which, if anything, will continue to increase. Such variables as currency, foreign festivals, increased production of goods in other lands, and the need for American goods in those lands, all necessitate international rate revisions and additions.

Promotional Experiments

Domestically too, there are many reasons for a continuance of 1949's stepped-up tariff activity. In the passenger field, the certificated carriers last year experimented more with special promotional fares than in any other year in airline history.

Stemming from a basic structure of 6.1c per passenger mile, fares of the domestic lines dipped to almost half that figure in certain instances. Nine carriers were participating in the scheduled air coach field, with the average fare running slightly over 4c per mile.

All but one domestic certificated line were offering passengers the so-called family plan which permits members of a family to travel at half-fare when accompanying the head of the family who is charged the full rate. Representative of a specific traffic-developing intent, the plan applies only to certain lightly traveled days of the week.

Group Rates

Many of the lines, mostly feeders, advanced reduced-fare plans for groups traveling together and for vacationists. Several trunklines devised a lower structure to build up off-season travel to Florida. And, in one case, a feeder established special prices for those in small cities desiring to shop in the larger towns on its routes.

While these programs necessitated voluminous tariff filings, however, they weren't responsible for all. The policy of CAB on promotional fares, at least until last September, was to approve tariffs for no longer than three months at a time. This required each line to revise its tariff every three months to reflect the most recent Board approval.

In September, however, the Board issued a promotional fare policy statement in which it OK'd coach tariffs and the family plan for nine months and most excursion tariffs for four months. Though helpful in a small way, periodic revisions are still necessary.

The only drop in tariff filings since the war has been in the number filed by non-scheduled airlines in 1949. This, of course, resulted from the reclassification of four cargo lines from "non-certificated" to "certificated" carriers, and the reduction in the total number of large irregular carriers engaged in air transport activities.

Cargo Filings Added

In the domestic cargo field, there was a decided increase in tariff proposals. Filings of the four all-cargo lines which had been certificated added to the increase, but numerous specific commodity rate changes and

Post-War Tariff Scoreboard

Of Domestic and Foreign Lines

	1946	1947	1948	1949
Tariff Filings:				
Certificated lines (Domestic)	2,306	4,203	4,249	4,603
Certificated lines (Int'l)	516	1,150	3,529	5,371
Non-Certificated lines	....	....	3,814	2,975
Freight Forwarders	....	....	....	721
Total	2,822	5,353	11,592	13,670
Special Tariff Permissions:				
Granted	135	247	742	722
Denied	7	16	73	124
Withdrawn	15	15	64	28
Total	157	278	879	874
Waiver Applications:				
Granted	57	48	63	55
Denied	0	3	10	9
Total	57	51	73	64
Tariff Rejections:				
Total	5	37	114	159

Source: Annual Reports of the Civil Aeronautics Board to Congress for fiscal years, 1946 through 1949.

additions comprised the bulk of cargo tariff matters.

Except for new joint rate proposals, the general commodity rate structure of the lines remained constant until January 1 of this year, when American, TWA, and United effected a 10% across-the-board increase. However, since almost 90% of the traffic carried by the nation's lines is at the lower specific commodity rates, the increase was relatively unimportant.

The rates on specific items, after a middle-of-the-year upward trend, dropped generally to the minimum rate level of 16c-13c per ton-mile set by CAB in 1948. Also, a large portion of eastbound shipments from California and northbound shipments from Florida moved at rates considerably below the minimums, although with CAB permission.

Then, for the first time last year, CAB required the certificated lines to file tariffs for charter operations. Previously, the carriers conducted charter flights under contracts with their rates known only to the contracting parties. However, CAB interpreted the Civil Aeronautics Act as giving it the power to require the filing of all charter rates and in midsummer the carriers complied, though several were reluctant.

With the creation of a new class of carriers, the international air freight forwarders, an additional source for increased tariff activity will be available for 1950. The promotional programs which were instituted last year and at the close of 1948 will continue.

Aircoach services will, from all indications, be continued, most likely on a larger scale. And, the air freight carriers have just begun to tap the potential which experts maintain is available to them. It is not unlikely that 1950 will see the heaviest tariff activity in airline history.

Final 1949 Traffic Rankings of All U. S. Scheduled Airlines

Total passengers . . . 16,817,870 **Cargo ton-miles . . . 181,754,177**

Rank	Airline	Revenue Passengers	Rank	Airline	Revenue Pass. Miles (000 omitted)	Rank	Airline	MAIL Ton-Miles*	Rank	Airline	EXPRESS Ton-Miles	Rank	Airline	FREIGHT Ton-Miles
1.	AA	3,310,246	1.	AA	1,572,863	1.	PAA	14,042,150	1.	PAA	37,337,630	1.	AA	33,025,319
2.	EAL	2,223,629	2.	UAL	1,339,658	2.	TWA	13,132,771	2.	TWA	10,914,960	2.	UAL	23,727,149
3.	UAL	2,206,746	3.	TWA	1,226,861	3.	UAL	11,152,588	3.	UAL	6,710,667	3.	TWA	12,035,978
4.	TWA	1,516,350	4.	PAA	1,190,007	4.	AA	9,057,965	4.	AA	5,581,042	4.	EAL	9,735,530
5.	Capital	1,215,672	5.	EAL	1,014,152	5.	EAL	4,954,748	5.	AOA	3,597,640	5.	NWA	9,138,691
6.	PAA	963,496	6.	NWA	496,943	6.	NWA	4,722,800	6.	EAL	3,560,551	6.	Capital	7,450,410
7.	NWA	772,094	7.	Capital	361,700	7.	AOA	2,167,479	7.	NWA	1,763,312	7.	Delta	1,885,917
8.	Braniff	606,784	8.	Braniff	228,648	8.	Braniff	1,100,937	8.	Capital	1,747,605	8.	Braniff	1,427,270
9.	Delta	524,476	9.	Delta	209,757	9.	Capital	1,066,534	9.	Panagra	1,623,981	9.	NAL	1,385,367
10.	NAL	356,355	10.	NAL	185,689	10.	Delta	900,582	10.	NAL	955,052	10.	C & S	955,204
11.	MCA	340,840	11.	AOA	185,012	11.	Panagra	579,386	11.	Braniff	832,518	11.	PAA	779,364
12.	Western	337,095	12.	C & S	134,765	12.	NAL	554,502	12.	Delta	717,372	12.	Hawaiian	599,559
13.	C & S	337,084	13.	Western	124,386	13.	C & S	542,483	13.	C & S	533,995	13.	Western	417,662
14.	NEA	326,031	14.	Panagra	105,968	14.	Western	449,663	14.	Western	316,588	14.	CAL	371,964
15.	Hawaiian	304,402	15.	MCA	100,284	15.	MCA	313,465	15.	MCA	217,395	15.	MCA	353,288
16.	Colonial	205,976	16.	CAL	66,809	16.	CAL	208,231	16.	Hawaiian	124,149	16.	Panagra	265,027
17.	CAL	183,693	17.	NEA	62,278	17.	Inland	117,232	17.	NEA	111,122	17.	NEA	229,966
18.	SWA	115,918	18.	Colonial	60,279	18.	Colonial	111,872	18.	CAL	97,881	18.	Colonial	161,483
19.	Pioneer	105,356	19.	Hawaiian	41,421	19.	NEA	98,200	19.	AAA	65,488	19.	Inland	126,815
20.	AOA	96,685	20.	Inland	31,349	20.	Pioneer	90,021	20.	Inland	64,736	20.	SWA	90,117
21.	Panagra	93,944	21.	Pioneer	29,216	21.	Hawaiian	62,097	21.	Piedmont	41,129	21.	Monarch	87,236
22.	Piedmont	86,292	22.	SWA	21,239	22.	TTA	59,143	22.	SWA	34,199	22.	Pioneer	77,843
23.	Inland**	85,098	23.	Piedmont	18,578	23.	SWA	51,136	23.	Chall.	33,330	23.	Chall.	76,396
24.	Caribair	78,845	24.	TTA	11,618	24.	AAA	41,454	24.	Pioneer	32,766	24.	Piedmont	62,414
25.	AAA (1)	73,576	25.	AAA	9,861	25.	Chall.	37,383	25.	TTA	22,372	25.	Caribair	31,894
26.	W. Coast	65,899	26.	W. Coast	8,716	26.	Piedmont	31,229	26.	Wis.-Cen.	22,305	26.	TTA	25,319
27.	TTA	49,924	27.	Chall.	8,332	27.	Monarch	25,651	27.	Monarch	20,329	27.	Robinson	16,472
28.	Trans-Pac. (2)	48,514	28.	Monarch	7,735	28.	W. Coast	20,594	28.	Southern	15,765	28.	Trans-Pac.	16,359
29.	Robinson	42,755	29.	Empire	7,571	29.	Empire	20,492	29.	Empire	14,446	29.	Turner	196
30.	Empire	34,352	30.	Trans-Pac.	6,889	30.	Southern	18,495	30.	W. Coast	11,679	30.	AAA	.....
31.	Wis.-Cen.	32,627	31.	Robinson	6,274	31.	Robinson	18,469	31.	Colonial	6,354	31.	AOA	.....
32.	Monarch	30,679	32.	Caribair	5,899	32.	Wis.-Cen.	9,857	32.	Robinson	5,228	32.	Central	.....
33.	Chall.	30,370	33.	Wis.-Cen.	4,943	33.	Caribair	8,122	33.	Florida	660	33.	Empire	.....
34.	South. (3)	10,665	34.	Southern	1,753	34.	Central	3,972	34.	Turner	446	34.	Florida	.....
35.	Florida (4)	3,026	35.	Florida	409	35.	Mid-West	2,273	35.	Trans-Pac.	285	35.	Mid-West	.....
36.	Central (5)	823	36.	Turner	109	36.	Florida	1,812	36.	Mid-West	1	36.	Southern	.....
37.	Turner (6)	586	37.	Central	100	37.	Wiggins	515	37.	Central	.....	37.	W. Coast	.....
38.	Mid-West (7)	533	38.	Mid-West	73	38.	Turner	102	38.	Caribair	.....	38.	Wiggins	.....
39.	Wiggins (8)	430	39.	Wiggins	43	39.	Trans-Pac.	.....	39.	Wiggins	.....	39.	Wis.-Cen.	.....
	TOTALS	16,817,870			8,888,207			65,776,735			77,197,968			104,556,209

* Includes Air Parcel Post.

** Operations of Western and its subsidiary, Inland, should be considered as consolidated, although reports are filed separately as shown here.

(1) Began passenger service March 7, 1949. (2) Began certificated operations June 6, 1949. (3) Began operations June 10, 1949.
(4) Terminated operations at end of March, 1949 in accordance with CAB's decision not to renew airline's temporary route certificate.
(5) Began operations September 15, 1949. (6) Began operations November 12, 1949. (7) Began operations October 21, 1949.
(8) Began operations September 19, 1949.

Source: Airline Reports to CAB

Trunk-Feeder Swap Trend—Good for All?

UNPROFITABLE operations at several small points on the routes of certificated trunklines mushroomed last year into one of modern aviation's most significant trends, that of transferring chronic money-losing points to the certificates of feederlines, or abandoning the points altogether.

The effect, in theory at least, is to strengthen the trunklines by streamlining their routes, while at the same time reducing mail pay needs which have been inflated by the presence of the uneconomic points.

Similarly, the feeders, which in most cases, share traffic at these marginal points with the larger trunklines, stand to benefit by the elimination of duplicating services. Carried further, the money-loser for both becomes the money-maker for the feeder whose mail pay needs likewise stand to be reduced.

With this in mind last year, the Civil Aeronautics Board initiated three proceedings in which the suspension of trunkline service at 13 small points was proposed. It was suggested that United might suspend operations at Eureka, Red Bluff, Monterey, Santa Barbara, Salinas, and Klamath Falls, in favor of Southwest Airways.

Suspensions Suggested

Also, it was suggested that both United and West Coast Airlines might benefit if United suspended operations at Salem and Bellingham. Similar beneficial results might be obtained, the Board said, if Pioneer Air Lines was the only carrier serving Las Vegas, N. M., Big Spring, Midland-Odessa, Waco, and Lubbock, Texas, one or more of which are currently served by Pioneer and Continental, American, or Braniff.

Very pointedly in these cases, CAB suggested "suspension" of trunkline service and not "abandonment." There are several reasons. One is to assure a continuation of service to the point if the feeder's temporary certificate is permitted to expire. Another, is to allow for an early end to the experiment if it proves unwise.

While most of the airlines admittedly favor the elimination of unprofitable stops—whether it be by transfer to a feeder or abandonment—they have expressed a lack of confidence in the ultimate result. If it means the strengthening of a feeder to the point where the feeder becomes, in effect, a regional trunkline, or if it means that a competitive trunkline may be awarded the point it abandons, they would rather continue serving the point, making up the difference in mail pay.

Cities Involved in Possible Transfers From Trunk to Feeder Routes

Cities	Present Service	Proposed Service	Cities	Present Service	Proposed Service
Eureka, Calif.	UAL/SWA	SWA	Abilene, Tex.	AA/PAL	PAL
Red Bluff, Calif.	UAL/SWA	SWA	Big Spring, Tex.	AA/PAL	PAL
Monterey, Calif.	UAL/SWA	SWA	Big Spring, Tex.	CAL/PAL	PAL
Santa Barbara, Calif.	UAL/SWA	SWA	Las Vegas, N. M.	CAL/PAL	PAL
Salinas, Calif.	UAL	SWA	Waco, Tex.	BNF/PAL	PAL
Klamath Falls, Ore.	UAL	SWA	Lubbock, Tex.	BNF/PAL	PAL
Salem, Ore.	UAL	WCA	Rock Springs, Wyo.	†UAL/CHA	†CHA
Bellingham, Wash.	UAL/WCA	WCA	Cheyenne, Wyo.	†UAL/CHA	†CHA
Midland-Odessa, Tex.	AA/PAL	PAL	Hattiesburg, Miss.	DAL	*SBC
			Meridian, Miss.	DAL	*SBC

† CHA represents merged Challenger-Monarch interests.

* A Board examiner has recommended that Southern Bus Company inherit two Delta Air Lines points if certificated. DAL would continue serving Meridian on an east-west route under the proposal.

Note—Only those lines involved in the CAB proceedings are listed as rendering present and proposed service to the points listed. In some cases, other lines are authorized to serve them also.

CAB States Policy

Perhaps aimed at stifling this pessimism, CAB in its opinion in the Bonanza-TWA Route Transfer Case, said it has neither the disposition nor the intention to permit feeders to metamorphose into trunklines competitive with the permanently certificated trunklines. Recognizing that some competition is inevitable, the Board pointed out it not only intends to minimize it, but to prevent its development to the greatest feasible extent.

Not all the lines, however, waited for a confident word from CAB. Chicago and Southern Air Lines which had rendered daily service to Peoria, Ill., for years without profit, applied for and received permission to drop the point from its routes.

At the same time, CAB approved the line's request to omit Springfield, Ill., from its certificate. The point was not being served by C&S but offered no traffic potential to the line. As a result, the carrier is offering non-stop service on all flights between the heavily traveled pair of points, Chicago and St. Louis.

NWA Files

Not long ago, Northwest Airlines filed an application with CAB for a temporary suspension of service at Eau Claire, Wausau, and Green Bay, Wis., all of which were being served by Wisconsin Central Airlines, a certificated feeder. NWA had been serving only Eau Claire, but stated that airport improvements were being made at the other two points which would necessitate service unless the Board approved suspension.

Statistically, continued service by Northwest to Eau Claire appeared futile. In November, 1949, for example, it carried only 49 passengers to and 64 passengers from the point. As a matter of fact, for the first 11 months of 1949, only 1,144 passengers originated there, according to NWA's traffic figures.

Wisconsin Central welcomed the withdrawal of the big trunkline and, with the entire matter in keeping with CAB's avowed policy, all are happy, including the taxpayers, for it eventually means a reduction in mail pay to both lines.

Foresight Difficult

Another in a somewhat similar category, although without immediate feederline relief, is TWA which has been authorized to serve six small towns in Ohio and one in Indiana for an experimental 2-year period which ends next September. Of these seven, three have never been served by TWA because of the absence of adequate airport facilities. Of the remaining four, the carrier desires to serve only two for an additional period—Zanesville and Mansfield, Ohio.

Traffic at Richmond and Springfield, Ohio, TWA said, has not been sufficient to warrant a continuation of service. Accordingly, it has asked CAB to omit them from its certificate next September.

Another angle to be considered is that many of the small points now being served by trunklines were certificated years ago when it took con-

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siderable foresight to envision the type of aircraft which has become standard equipment today. Many of these small communities are financially unable to construct airports suitable for four-engined or high-powered twin-engined planes.

As a result, unless CAB permits the trunklines to suspend or abandon service at these points, the lines are forced to maintain and operate obsolete equipment for no other reason. This ultimately results in an expensive operation for the carrier, necessitating government subsidy, and restrains it from putting forth its best efforts between cities which are truly trunkline stops.

AA and Jackson

Directly involved in such a case is American Airlines which has applied for the right to suspend service at Jackson, Mich., and Abilene, Texas. Neither point, AA claims, maintains an airport adequate for its modern fleet of Convair and DC-6 aircraft. American has dissolved its DC-3 fleet with which it formerly served the points.

Whether it will be officially authorized to continue the suspension which is effective pending the outcome of its request, is something in which the industry is vitally interested. For, with all trunklines gradually making the swing to larger aircraft, the issue is bound to become repetitious.

Decisions to omit small uneconomical stops from trunkline routes are not hasty. In most cases the lines have exhausted all efforts to develop sufficient traffic potential to warrant a continuation of operations. But, where the airplane appears to be outgrowing the city, and the city best belongs on the routes of a smaller line, or where the city isn't an airline point at all, then the inevitable conclusion appears to be abandonment—if the trunklines are to become and remain self-sufficient.

Air Coach Off To Big Start in '49

AIR COACH services operated by the domestic airlines in 1949 carried over 340,000 passengers and showed an overall passenger load factor of 72.2%.

Seven airlines replying to an AMERICAN AVIATION survey carried 338,089 coach passengers. Figures were not available from Western Air Lines, which started service October 15 between Los Angeles and Seattle, and not included in the survey were services started in late December—American's transcontinental, Delta's Chicago-Miami and Eastern's Chicago-Miami. These figures would have put the industry total over 340,000.

The seven airlines performed 250,-

989,931 coach passenger-miles and had available 347,534,251 coach seat-miles for a load factor of 72.2%—considerably higher than the overall domestic load factor of 59.16%. The coach passenger-miles constituted 3.7% of the domestic industry's total passenger-miles, and the 338,089 passengers were 2.3% of total passengers.

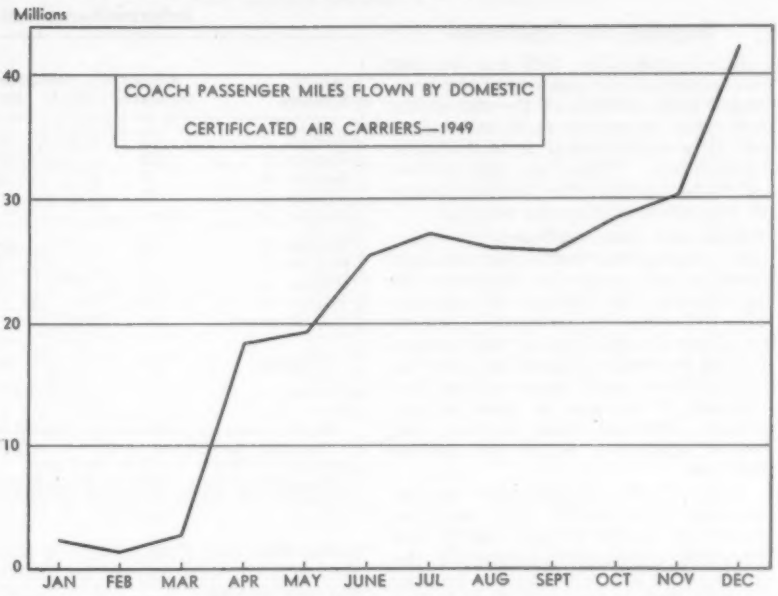
These figures would undoubtedly have been higher had the airlines operated coach flights throughout the entire year. However, Capital Airlines was the only carrier with such flights during all of 1949, the remainder starting during the year. Two airlines, Continental and Mid-Continent, gave up coach service during 1949 because load factors were not up to expectations. At year-end, eight carriers were offering the low-fare flights over portions of their systems: Capital, American, TWA, Eastern, Northwest, National, Delta and Western.

Air coach was becoming an important source of business for some airlines. Capital, for example, performed 23% of its passenger-miles in coach service, and Northwest 21%. Capital led the industry in coach passengers carried during the year, while Northwest was ahead in passenger-miles.

Coach traffic increased steadily from the beginning of 1949 to midsummer. Following a mild slump in August and September, it picked up in October and reached the year's high in December when over 51,000 passengers were carried and approximately 43 million coach passenger-miles were flown. Coach load factors were highest in June (86%) but fell off later when capacity increased faster than traffic. However, the low of 56% in November was followed by the December upsurge which pushed the load factor up to 65%.

In the international field, 98,150 passengers used the low-fare services offered by Braniff, Northwest and Pan American World Airways. The international load factor did not approach that in the domestic field, reaching 54.9%, with 215,855,860 passenger-miles against 392,747,347 available coach seat-miles.

Air Coach Traffic Soars . . .



1949 Domestic Air Coach Results

Company	Passengers	Passenger-Miles	Available Coach Seat-Miles	Load Factor
Capital	152,727	81,343,800	120,889,971	67.2
Continental	3,738	2,064,996	5,197,962	39.7
Eastern	20,322	19,881,328	26,856,384	74.0
Mid-Continent	6,942	1,837,992	3,528,588	52.0
National	4,790	5,286,028	8,978,275	58.8
Northwest	85,750	90,896,559	117,727,641	77.2
TWA	63,820	49,679,226	64,355,430	77.1
Western	NA	NA	NA	NA
TOTALS	338,089	250,989,931	347,534,251	72.2

NA: Not available.

1949 International Air Coach Results

Braniff	5,300	9,534,000	21,411,000	44.5
Northwest	11,034	16,157,578	22,720,793	71.1
Pan American	81,816	190,164,282	348,615,554	54.5
TOTALS	98,150	215,855,860	392,747,347	54.9

NOTES:

Continental started service Feb. 17 and discontinued Sept. 30, 1949.
Eastern started coach operations Sept. 25, 1949.
Mid-Continent started service Mar. 1 and discontinued Aug. 10, 1949.
National started Nov. 1, 1949.
Northwest started Mar. 24, 1949.
TWA started Feb. 6, 1949.
Western started Oct. 15, 1949.
Northwest's international listing covers coach service to Anchorage, Alaska.
Braniff's listing covers tourist service to Latin America.
Table does not include services started in late December: American's transcontinental, Delta Chicago-Miami, and Eastern Chicago-Miami.

Large Irregulars Past Traffic Peak

THE LARGE irregular or nonscheduled air carriers of the country continued to siphon passenger revenues away from the certificated airlines last year, but they appeared to be on the decline and it was believed possible that 1949 would be the last big traffic year for the majority of such carriers.

According to reports filed with the Civil Aeronautics Board, as required under the terms of their letters of registration, the 45 principal irregular air carriers transported 229,705 revenue passengers and flew more than 450,000,000 revenue passenger miles.

At 3c per mile, this volume would total $13,500,000 in passenger revenues.

How much of this business the scheduled lines might have gotten had there been no competition from the non-skeds is difficult to estimate, but even 25% of it would have meant several million dollars of additional passenger revenues to the certificated lines. In 1948, the revenues diverted to the non-skeds would have meant the difference between loss and profit for a number of the scheduled airlines, but last year it wasn't so critical

because of the latter's improved traffic and earnings.

Regulations Tightened

In all probability, 1949 was the last year in which the passenger and passenger-mile volume of the non-skeds will come anywhere close to a quarter of a million and a half-billion, respectively. There are two principal factors behind the decline coming in non-scheduled traffic volume:

• **CAB last year tightened** the economic regulations pertaining to such carriers and compelled them to file individually for letters of registration. Dozens of irregular carriers promptly dropped out of the picture, feeling themselves unable to meet the qualifications and requirements demanded of holders of such letters. Others obtained their letters, but ceased operations before the end of the year.

Also, CAB's enforcement section cracked down harder than ever on violations of the Board's safety and economic regulations, principally the latter, with the result that a number of non-skeds either had their letters suspended or voluntarily surrended them.

Airlines Start Coaches

• **Major factor in the decline** of the large irregular carriers in 1949, however, was the growth of air coach business of the scheduled airlines. Price had been the big attraction of the non-skeds, and when the certificated lines met them on nearly their own terms in this respect the former felt the effects.

The 45 large irregulars listed in the accompanying tabulation carried only about 1.8% of the number of passengers carried by the scheduled domestic lines last year and only 6.7% of the revenue passenger miles.

In other words, the entire group of 45 irregulars flew only about as many passengers and passenger miles in the full year as the scheduled domestic carriers flew in one week and three weeks, respectively.

Only 15 of the 45 flew more than 10,000,000 passenger miles last year, which is about what a large scheduled line will fly in one weekend. Only a few of them owned more than two or three aircraft, and all the nation's 94 irregulars, large and small, operated 178 transport aircraft, as compared to the more than 1,000 operated by the scheduled lines (see table).

Irregular Air Carrier Aircraft

International and Domestic Service

CAA Regions	Active Operator	Douglas DC-4	Douglas DC-3	Lockheed 18	Curtiss C-46	Boeing B-247	PBY	Total
Region 1	17	5	10	..	8	..	..	23
Region 2	22	..	19	..	27	..	..	46
Region 3	3	..	3	..	..	..	..	3
Region 4	6	1	6	..	..	..	..	7
Region 5	None							
Region 6	22	9	25	..	7	1	..	42
Region 7	9	..	7	..	9	..	1	17
Region 8	11	3	4	1	4	..	1	13
Region 9	1	..	..	..	1	..	..	1
Int. Reg.	3	14	..	..	12	..	..	26
TOTAL ...	94	32	74	1	68	1	2	178

Source: AMERICAN AVIATION Survey

NOTE: Includes operators certificated under CAR 45, in addition to CAR 42.

Regional distribution of aircraft is based on locatoin of principal maintenance base for the particular aircraft involved.

Excludes aircraft which may be operated by scheduled air carriers in irregular air carrier service except when such aircraft are utilized in irregular air carrier operation only.

1949 Traffic Results of U. S. Large Irregular Air Carriers

Carrier	Revenue Passengers	Revenue Passenger-Miles	Carrier	Revenue Passengers	Revenue Passenger-Miles
Air America, Inc.	19,294	37,956,770	Miami Air Line, Inc.	5,496	10,293,501
Air Service, Inc.	756	2,704,000	Modern Air Transport, Inc. ...	7,993	9,214,747
Air Transport Associates, Inc. ..	7,031	11,133,289	Monarch Air Service	673	669,345
Airborne Transport. Inc.	466	974,084	McKinley Airways, Inc.	1,936	2,705,465
Airline Transport Carriers	3,594	6,595,689	Nationwide Air Transport, Inc.	12,838	16,297,231
American Air Transport, Inc. ..	7,146	7,756,965	New England Air Express, Inc.	6,960	14,515,456
American Flyers, Inc.	892	2,512,397	Pearson Alaska Airlines	141	208,200
Arctic Pacific, Inc.	1,916	3,290,648	Peninsular Air Transport, Inc.	3,177	4,022,470
Arnold Air Service	3,589	6,093,134	Quaker City Airways	874	701,652
Arrow Airways	7,408	24,188,526	Robin Airlines	5,514	13,941,487
Associated Air Transport, Inc.	4,506	7,680,104	SSW, Inc.	345	822,850
Associated Airways	9,338	21,373,918	Seaboard & Western Airlines ..	3,995	15,280,706
Aviation Corp. of Seattle, Inc.	11,604	19,992,000	Sourdough Air Transport	315	519,139
Blatz Airlines, Inc.	2,028	1,978,104	Standard Air Cargo, Inc.	3,096	5,695,294
Continental Charters, Inc.	3,438	9,124,259	Stewart Air Service	1,667	594,940
Economy Airways, Inc.	1,339	2,964,221	Totem Air Service, Inc.	1,068	955,632
Mason-Dixon Line	938	991,912	Trans-American Airways, Inc.	6,502	14,042,930
General Airways, Inc.	1,433	916,428	Trans-Caribbean Air Cargo	2,682	4,358,250
Golden Airways, Inc.	1,090	1,657,670	Trans-National Airlines	9.204	19.821,749
Golden North Airways, Inc.	2,648	1,590,384	Transocean Air Lines	42,622	96,510,783
Great Lakes Airlines, Inc.	5,597	11,157,534	Twentieth Century Airline	935	265,275
Los Angeles Air Service	3,357	3,556,380	Viking Air Lines	9,195	37,365,712
Meteor Air Transport, Inc.	3,069	1,322,856	TOTALS	229,705	456,314,086

Air Freight Volume Swings Up 27%

THE air freight curve continued its upward climb through 1949, but the precipitous rate of climb of the two preceding years gave way last year to a more gradual rise.

The big question was whether air freight volume was approaching a plateau beyond which it would not be likely to go until such time as a truly efficient cargo plane is made available, or whether the abnormal postwar boom in air freight had merely given way to a sound but decelerated growth period.

Reports filed with the Civil Aeronautics Board by the 16 domestic trunk airlines and the three major domestic all-cargo lines show that air freight volume for 1949 amounted to 131,895,585 ton-miles, as compared to 103,500,169 ton-miles in 1948. This was an increase of 27.4%, which was the lowest percentage gain in any year since air freight started its upward climb in 1946.

Air Express Declines

However, air express volume declined 8.1% last year, from 29,787,953 ton-miles to 27,376,591 ton-miles, and it was quite probable that the 2.4 million ton-miles that air express lost was diverted either to air parcel post or to air freight. Air freight and air express volumes of the 19 lines, when combined, add up to 159,272,176 ton-miles, as against 133,290,122 ton-miles for 1948, thus reducing the 1949 air cargo gain to 19.5%.

Slick Airways, largest of the certificated all-cargo carriers, experienced a drop of close to two million ton-miles last year, flying 23,602,074 ton-miles as against 25,579,493 ton-miles in 1948. U. S. Airlines increased its volume, however, and The Flying Tiger Line had a sizable increase—from 6,781,521 to 11,942,239 ton-miles.

These three carriers, which did not gain certificated status until last summer and did not begin certificated operations until late summer or early fall, flew a combined total of 36,390,076 ton-miles during the year, which was an increase of 11.1% over the 32,752,196 ton-miles flown in 1948. They flew 27.6% of the volume reported by the 19 lines last year, as against 31.6% the year before.

Trunks Carried 72%

Much better was the showing of the 16 trunklines certificated for mixed operations. They flew 95,505,509 ton-miles last year, which was 72.4% of the total volume reported and represented a 35.0% increase over the 70,749,953 ton-miles they flew in 1948, when they flew 68.4% of the volume of the entire group of 19 carriers.

Major gainer in the air freight field last year was American Airlines, which had an increase of close to 50%, while others making sizable gains included The Flying Tigers, Capital Airlines, Eastern, Northwest and United. American was the only one of the Big Four carriers to show a gain in express ton-miles in 1949.

The principal developments of the year in the air freight field were the temporary certification of the air freight forwarders and of Slick, U. S. and the Tigers, an increase in all-cargo flights operated by the passenger-carrying lines, and the establishment of additional special commodity rates.

Air Cargo Growth—1948-1949

Domestic Trunklines & Certificated All-Cargo Carriers

CARRIER	1949 Freight Ton-Miles	1949 Express Ton-Miles	1948 Freight Ton-Miles	1948 Express Ton-Miles
American	31,845,434	5,578,531	21,822,054	5,529,695
Braniff	1,174,865	832,518	1,196,850	873,738
Capital	7,450,410	1,747,605	5,199,014	1,909,794
C & S	632,951	533,995	548,294	600,966
Colonial	110,397	69,354	50,705	52,233
Continental	371,964	97,881	272,743	99,841
Delta	1,885,917	717,372	1,677,390	856,997
Eastern	9,114,101	3,560,551	5,730,243	3,784,534
Inland	126,815	64,736	82,831	55,242
Mid-Continent	353,288	217,395	275,399	187,456
National	1,385,367	588,466	705,453	586,143
Northeast	229,966	111,122	189,644	104,903
Northwest	4,643,245	1,657,866	2,546,489	1,730,248
TWA	12,035,978	4,878,633	9,999,732	5,886,216
United	23,727,149	6,403,978	19,807,208	7,222,699
Western	417,662	316,588	643,924	307,248
All Cargo				
Flying Tigers	11,942,239	.....	6,781,521	.....
Slick	23,602,074	.....	25,579,493	.....
U. S. Airlines	845,763	.....	391,182	.....
TOTALS	131,895,585	27,376,591	103,500,169	29,787,953

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U. S. Captures 60% of Atlantic Traffic

By Eric Bramley

. . . but competition gets stiffer

A TOTAL of 266,535 persons traveled both ways across the North Atlantic by air in 1949 on the 10 scheduled airlines flying the route. Of the total, 60.1% flew on the three U. S. air carriers while 39.9% used the seven foreign lines. Figures include traffic and schedules from both the U. S. and Canada to European points and beyond.

In order to get 60.1% of the business, the three U. S. carriers flew 61.1% of the flights, while the foreign lines secured their 39.9% of the traffic with 38.9% of the schedules. Charter flights are not included in the passenger or schedule totals.

The U. S. airlines' percentage of total business was not as large in 1949 as it had been in previous postwar years, when the figure had been 70% or better. However, their percentage of schedules was likewise not as high, with the foreign carriers adding trips as equipment became available.

Other statistics show that a total of 651,640 travelers crossed the North Atlantic both ways by steamship last year (all classes of accommodations) compared with an airline total of 273,025. The latter figure differs from the 266,535 quoted above in that it would include charters and possibly non-revenue traffic. On this basis, air travel was some 41.8% of steamship travel in 1949.

Pan American World Airways operated the most flights (2,490) and carried the most passengers (60,556) last year, followed by TWA (2,209 flights and 52,652 passengers) and American Overseas Airlines (1,773 and 46,982). Of the foreign carriers, Air France led in passengers carried with 21,365, Trans-Canada was second with 21,285 and Scandinavian Airlines System third with 19,608.

British Overseas Airways Corp. made the best showing in passengers per flight, with a 1949 average of 29.9. The best U. S. airline in this category was American Overseas (26.4).

Outbound from the U. S. and Canada, the U. S. airlines carried 71,735 out of the total of 119,938 passengers making the journey, or 59.8%, and flew 60.9% of the trips. Foreign lines carried 48,203, or 40.2% and flew 39.1% of schedules.

Inbound, U. S. carriers hauled 88,455 of 146,597 persons, or 60.3% on 61.3% of the schedules. Foreign lines carried 58,142, or 39.7% on 38.7% of the trips.

In the cargo field, the airlines were much closer together. Of the 10,784,163 lbs. carried both ways, 5,794,941 lbs., or 53.7%, were on U. S. planes, with 4,989,222 lbs., or 46.3%, on foreign lines. Eastbound, the percentage split was 52.6% U. S. and 47.4% foreign, while westbound the figures were 55.1% and 44.9%, respectively. In addition to carrying cargo on regular schedules, the U. S. and foreign lines flew 306 eastbound and 296 westbound all-cargo trips during the year.

In the carriage of mail, the U. S. lines were far ahead, due to the fact that they hauled 81.4% of the eastbound mail. Westbound, the foreign lines were in the lead, carrying 56.5%. Both ways, the mail total was 6,882,569 lbs., divided 65.5% U. S. and 34.5% to foreign carriers.

Air Traffic Between U. S.-Canada and Europe

Outbound

	AOA	Air France	BOAC	KLM	PAA	SABENA	SAS	Swissair	Trans-Canada	TWA	TOTAL
Revenue Passengers ..	21,167	10,224	8,723	7,526	26,359	2,611	8,697	988*	9,434	24,209	119,938
Passenger Flights	884	398	310	346	1,248	126	353	62	477	1,100	5,304
Av. Pass. per Flight ..	23.9	25.6	28.1	21.7	21.1	20.7	24.6	15.9	19.7	22.0	22.6
Cargo (tons)	324	289	291	373	740	86	195	12	210	558	308
Mail (tons)	409	48	97	29	604	10	61	3	121	612	1,995

Inbound

Revenue Passengers ..	25,815	11,141	10,031	9,614	34,197	3,294	10,911	1,300	11,851	28,443	146,597
Passenger Flights	889	399	317	352	1,242	127	354	63	431	1,109	5,283
Av. Pass. per Flight ..	29.0	27.9	31.6	27.3	27.5	25.9	30.8	20.6	27.4	25.6	27.7
Cargo (tons)	258	153	153	328	608	29	131	10	238	408	2,313
Mail (tons)	147	227	371	47	203	19	132	9	10	286	1,446

Both Ways

Revenue Passengers ..	46,982	21,365	18,754	17,140	60,556	5,905	19,608	2,288	21,285	52,652	266,535
Passenger Flights	1,773	797	627	698	2,490	253	707	125	908	2,209	10,587
Av. Pass. per Flight ..	26.4	26.8	29.9	24.5	24.3	23.3	27.7	18.3	23.4	23.8	25.1
Cargo (tons)	583	443	445	700	1,348	115	346	23	444	976	5,392
Mail (tons)	556	275	468	76	808	29	193	12	131	893	3,441

NOTE:: Charter flights are not included in totals
* Swissair operated during seven months of 1949

1949 Trans-Atlantic Passengers -- Ship vs. Air

	STEAMER						AIR	
	First Class	One Class	Cabin Class	Tourist Class	No. of Voyages	Total Passengers	No. of Flights	Total Passengers
Outbound .	73,400	36,791	59,516	115,214	519	284,921	5,360	122,166
Inbound . . .	82,130	64,877	73,010	146,702	528	366,719	5,393	150,859
Both Ways .	155,530	101,668	132,526	261,916	1,047	651,640	10,753	273,025

Record Expenditures Abroad:

Average 1949 European Air Trip $770 Cheaper Than Ship

U. S. RESIDENTS traveling abroad in 1949 spent a record $695,000,000 in foreign countries, exclusive of fare payments to and from noncontiguous areas, an increase of 15% over 1948 and 44% over the 1929 prewar peak of $483,000,000.

The average 1949 air traveler to Europe and the Mediterranean made his trip considerably cheaper than the average first-class sea passenger. The latter spent $946 for round-trip fare and shipboard expenses and $1,276 in foreign countries, for a total of $2,222. The air traveler spent $694 for fare and expenses plus $757 abroad, totaling $1,451. He stayed abroad an average of 47 days against 55 for the first-class ship traveler.

The dollars spent abroad by Americans can be classified as U. S. "imports" from foreign countries, and the $695,000,000 figure for 1949 constituted the largest single commodity import except coffee.

These figures are part of a study just completed by the Office of Business Economics of the Department of Commerce, and reported in the March issue of "Survey of Current Business" by Frances P. Sasscer.

Division by Area

The $695,000,000 expenditure was divided as follows: Europe and Mediterranean, $185,000,000 or 26.6% of total; Canada, $280,000,000 or 40.3%; Mexico, $135,000,000 or 19.4%; West Indies and Central America, $57,000,000 or 8.2%, and other countries, $38,000,000 or 5.5%.

Europe-Mediterranean expenditures in 1949 were about 13% under the 1929 peak. The downward trend, according to the study, presumably reflects in large part the declining number and increased age of the foreign-born population of the U. S. following the restrictive legislation of the early 20's. This group furnished about 58% of the number of persons traveling to Europe and the Mediterranean in 1929 against 51% in 1949.

Of interest to airline officials studying travel trends is the fact that 62% of total American travel payments to Europe and the Mediterranean in 1949 was made in France, the United Kingdom and Italy. France received the largest share of the American's tourist's expenditures in Europe, in contrast to the late 30's when the United Kingdom was in first place. Also, the highest per capita expenditures in 1949 were made in France despite the fact that the average length of stay was only 22 days (U. S. travelers stayed longer in Italy, Ireland, Norway and the U.K.).

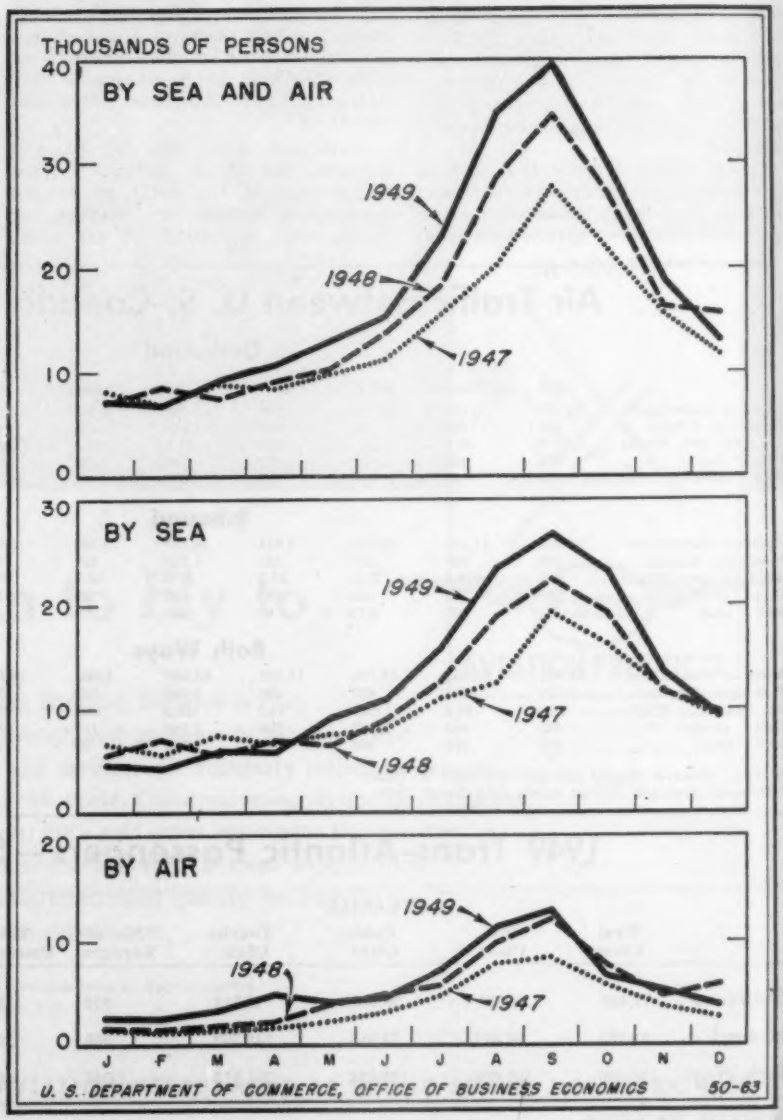
France Ranks First

A greater proportion of American visitors to Europe last year visited France than any other European country, with the U.K. second. Italy ranked third, up 25% over 1937, and the Department of Commerce attributes the increase to heavy travel to Italy by U. S. foreign-born citizens, superimposed on normal tourist travel, both of which had been curtailed in the middle and late 30's due to political disturbances.

In 1949, U. S. citizens in the Europe-Mediterranean areas spent an average of $771 per trip, not including fare. The average length of stay was 63 days. The 1948 average stay was 79 days which, according to the study, reflected the backlog of family travel accumulated during the war. Evidence that the backlog is being worked off is the decline in proportion of alien-born travelers from 60% in 1948 to 51% last year.

As for the future, the study asserts

U. S. Citizens Arriving at Port of New York From Europe, 1947-49



that the "favorable exchange rates resulting from currency devaluations, along with liberalized customs exemptions, large-scale interchange of students and teachers between the United States and Europe, and an awakened interest in foreign culture aroused by the war, should serve to stimulate travel to Europe. . . ."

Canadian All-Time High

Travel expenditures in nearby areas, Canada, Mexico and the Caribbean, reached new highs in 1949. American travelers spent $280,000,000 in Canada, the highest amount ever recorded for expenditures in any single country. Mexico, with $135,000,000, received more U. S. tourist dollars than any country except Canada. In each of these countries, spending by persons living or visiting adjacent to the international boundary forms a significant fraction of the total—22% for Canada and 48% for Mexico.

Factors contributing to the increase in travel to these nearby areas include:

(1) the economic depression of the '30's led to substitution of lower cost foreign travel for European trips;

(2) improvement in Canadian and Mexican highway systems;

(3) increase in the number of paid vacations, with the typical vacation period (two weeks) permitting Canadian and Mexican trips, but not to Europe, except by air;

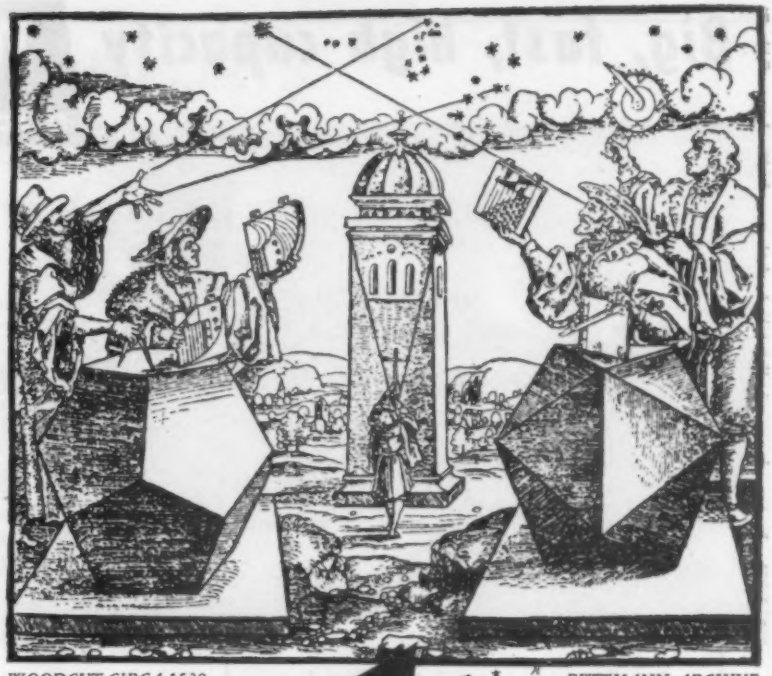
(4) reduction in European travel after 1929-30 led to the transfer to many ships to Caribbean cruise travel, leading to an increase in the number of cruise passengers;

(5) rapid expansion of facilities for air travel to the Caribbean increased travel to that area by reducing the time necessary for a trip, particularly by people who are vacating in Florida.

Air Helps Latin Travel

These factors, the Department of Commerce states, may not have as much influence in the future and they did during the interwar period. "High economic activity may reduce the urge of substituting travel in nearby areas for trans-Atlantic vacations. The improvement of the highway system in the United States and Canada is not likely to proceed at the same pace as before the war, and the number of automobiles in use is not expected to rise at the prewar rate. Consequently, the extension of the prewar trend will depend upon the appearance of other stimulating factors."

Concerning South America, the study finds that the increase in business affiliations with South America during the past decade has been responsible for a portion of the increase in travel. Also, the growth of air transportation facilities has served to make South America more accessible for travelers.



WOODCUT CIRCA 1530 — BETTMANN ARCHIVE

Written in the stars

For centuries, man has looked to the universal constants, the stars, to establish his location on the earth's surface. The advent of modern, high-speed aircraft, however, raised a new problem in celestial navigation— that of plotting, instantly and accurately, the position of a rapidly moving object. Time-honored nautical methods proved inadequate.

The recently developed Kollsman Periscopic Sextant, with special automatic averager, enables the airborne navigator of high-speed craft to obtain a series of extremely accurate sights. It also eliminates the need for an astrodome.

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Terminal Airports Get Bulk of Funds

. . . 504 grants in 1949

THE EMPHASIS in the Civil Aeronautics Administration's Federal-aid airport program shifted in 1949 to terminal-type airports in accord with the thinking of Congress and the Air Coordinating Committee.

Approximately one-third of the grant agreements executed by the agency during the year provided funds to match local allocations for the construction or improvement of Class 4 and larger airports, and the percentage of the total available funds going to such projects was probably much greater.

Of 504 grant agreements signed by CAA, on the one hand, and city, county or state governing bodies on the other, 164 covered new terminal-type airports or the further expansion or development of existing fields of that category. The state receiving the greatest number of such grants during the year was Texas, with 15, followed by California's 13 and New York's 11.

Texas in Front

The second largest number of grant agreements affected Class 1 airports, there being 118 such projects on the list. Texas was far out in front in this category, with 33 projects, and California was close behind with 31. The northern tier states of Montana, Minnesota, Washington, Idaho and North Dakota accounted for more than 100 of these smaller projects.

Class 2 and Class 3 airports, those of intermediate size, each accounted for 110 of the 1949 grant agreements and were well scattered over 43 of the 48 states.

Federal funds involved in the 504 grant agreements totaled $44,868,671, according to a CAA tabulation. Biggest sum went to New York State, which got $6,750,111, a sizable part of which went toward the development of New York International Airport. Texas got the next largest amount, $3,041,776, while California ran third with grant agreements totaling $2,598,716 of Federal funds.

Other states getting more than $1,000,000 each under last year's grant agreements were Colorado, Florida, Georgia, Indiana, Iowa, Louisiana, Minnesota, New Jersey and Pennsylvania.

Much of the money involved in the 1949 grant agreements will not be spent until this year, CAA pointed out.

Federal-State Airport Grant Agreements

1949

State	Federal Funds	No. of Airports	Airport Class 1	2	3	4 & Larger
Alabama	190,886	3	....	....	2	1
Arizona	1,998,327	11	....	3	4	4
Arkansas	139,439	6	2	1	1	2
California	2,598,716	31	7	7	4	13
Colorado	1,004,641	11	1	1	7	2
Connecticut	198,169	2	....	....	....	2
Delaware	40,902	1	....	....	....	1
Florida	1,976,471	6	2	1	1	2
Georgia	1,339,479	6	....	1	1	4
Idaho	388,639	24	15	5	2	2
Illinois	981,512	9	....	4	3	2
Indiana	1,047,415	10	....	5	2	3
Iowa	1,343,815	21	8	3	6	4
Kansas	612,335	18	4	7	2	5
Kentucky	731,314	7	3	....	2	2
Louisiana	1,497,321	8	2	1	1	4
Maine	153,451	6*	1	....	3	1
Maryland	698,640	4	1	....	1	2
Massachusetts	360,359	5	2	1	1	1
Michigan	976,638	15	1	6	5	3
Minnesota	1,842,653	25	8	10	3	4
Mississippi	180,917	10	....	2	3	5
Missouri	658,950	14	5	2	5	2
Montana	357,628	17	8	3	2	4
Nebraska	901,541	18	9	5	2	2
Nevada	793,926	4	....	....	2	2
New Hampshire	95,959	4	....	2	2	....
New Jersey	1,332,307	3	1	1	....	1
New Mexico	358,598	7	....	....	4	3
New York	6,750,111	15	....	2	2	11
North Carolina	449,405	8	....	2	2	4
North Dakota	283,253	19	10	1	4	4
Ohio	881,270	9	....	1	4	4
Oklahoma	946,186	18	6	3	3	6
Oregon	598,032	12*	2	2	1	6
Pennsylvania	1,671,640	11	1	3	3	4
South Carolina	322,071	4	....	....	....	4
South Dakota	881,531	9	1	2	4	2
Tennessee	708,878	12	5	2	2	3
Texas	3,041,776	33	6	10	2	15
Utah	682,366	11	....	5	3	3
Vermont	77,557	2	....	1	....	1
Virginia	172,500	2	....	....	....	2
Washington	783,613	18	5	4	2	7
West Virginia	807,604	4	....	....	2	2
Wisconsin	887,168	8	2	....	3	3
Wyoming	122,762	3	....	1	2	....
TOTALS	44,868,671	504	118	110	110	164

* Includes 1 Seaplane Base.

Source: Civil Aeronautics Administration

Airports Near 6,500 Mark

WHILE MAJOR portion of Federal funds last year went to large terminal-type airports, there was only a slight numerical gain in airports available for airline service.

Official figures of the Civil Aeronautics Administration reveal a net gain of only 17 airports Class 3 and over, between January 1, 1949 and the first of this year. Most of this gain—15—showed up in the Class 3 group which can accommodate only the smaller type transports.

Airports of all classes as of January 1, 1950, totaled 6,484—up 70 from the previous year. In the Class 6 and over category, so important to major airline operations, there was an increase of only five, from 144 to 149.

The figures indicate that bulk of the Federal assistance was going into improvements of existing facilities rather than expansion into larger fields or creation of new ones.

Biggest gain was registered in the small Class 1 and under group, which went up 35, from 4,065 to 4,100. An undetermined number in this small class went out of business entirely with the continuing slump in the light plane industry, but new ones created offset the loss.

Classes of Airports by States

(CAA Figures As of January 1)

State	Sub I & I		II		III		IV		V		VI & Over		Total	
	1950	1949	1950	1949	1950	1949	1950	1949	1950	1949	1950	1949	1950	1949
Alabama	47	51	16	17	13	14	12	13	1	0	2	2	91	97
Arizona	68	76	50	44	32	38	14	14	13	12	2	3	179	187
Arkansas	57	55	11	13	11	15	8	8	1	0	0	0	88	91
California	278	259	88	69	49	41	37	36	33	35	24	23	509	463
Colorado	57	54	23	24	20	13	1	1	2	4	6	5	109	101
Connecticut	25	24	1	1	3	3	4	4	1	1	0	0	34	33
Delaware	11	13	3	4	0	0	1	1	0	0	2	2	17	20
District of Columbia	0	0	0	0	0	0	1	1	1	1	1	1	3	3
Florida	54	58	24	32	46	44	40	48	12	11	15	15	191	208
Georgia	64	59	17	28	24	24	22	23	3	4	4	3	134	141
Idaho	101	84	11	11	7	9	2	2	0	0	3	3	124	109
Illinois	113	126	42	36	5	4	9	7	4	4	0	0	173	177
Indiana	112	115	29	34	8	9	9	9	2	2	0	0	160	169
Iowa	152	150	19	23	4	2	7	7	0	0	1	1	183	183
Kansas	127	141	25	22	17	16	4	5	9	10	8	8	190	202
Kentucky	54	56	4	2	4	4	4	4	0	0	1	1	67	67
Louisiana	40	54	14	17	12	10	8	9	2	2	3	3	79	95
Maine	41	49	6	6	12	12	2	2	2	2	2	2	65	73
Maryland	24	24	14	15	5	3	6	8	0	0	2	2	51	52
Massachusetts	54	57	8	4	9	9	7	7	0	0	3	3	81	80
Michigan	173	171	48	38	14	10	11	13	2	2	2	1	250	235
Minnesota	83	81	31	30	7	6	4	4	1	1	1	1	127	123
Mississippi	48	57	17	15	12	13	9	7	0	0	1	2	87	94
Missouri	79	75	21	24	12	11	5	5	3	3	1	1	121	119
Montana	72	64	18	18	7	8	6	5	2	2	4	4	109	101
Nebraska	102	103	16	18	4	0	2	4	2	2	11	10	137	137
Nevada	28	21	7	5	11	14	10	9	9	9	1	1	66	59
New Hampshire	26	21	4	5	3	3	2	2	0	0	1	1	36	32
New Jersey	64	63	16	17	8	7	4	4	0	0	2	2	94	93
New Mexico	65	68	13	14	6	6	9	9	8	8	7	6	108	111
New York	206	215	29	30	11	12	14	13	5	4	2	2	267	276
North Carolina	96	103	14	14	18	16	12	12	2	2	4	4	146	151
North Dakota	107	67	15	15	5	3	6	6	0	0	0	0	133	91
Ohio	189	190	41	41	10	9	8	7	2	2	2	2	252	251
Oklahoma	89	105	25	24	12	14	13	13	6	6	3	3	148	165
Oregon	76	75	11	9	11	12	14	14	4	4	1	1	117	115
Pennsylvania	161	171	35	33	14	13	7	8	1	0	0	0	218	225
Rhode Island	6	7	1	0	2	2	0	0	2	2	0	0	11	11
South Carolina	28	30	13	13	4	5	11	10	6	6	3	3	65	67
South Dakota	51	51	6	6	5	3	3	4	2	2	2	2	69	68
Tennessee	46	40	16	24	5	7	6	6	1	1	0	0	74	78
Texas	392	371	114	113	54	61	52	43	25	27	10	9	647	624
Utah	22	24	15	11	13	15	4	4	5	4	1	1	60	59
Vermont	19	19	0	0	3	4	1	0	0	0	0	0	23	23
Virginia	83	88	17	14	10	10	11	11	2	2	2	2	125	127
Washington	116	102	23	23	10	10	17	17	5	5	7	7	178	164
West Virginia	46	36	7	10	2	2	3	3	1	1	0	0	59	52
Wisconsin	120	115	36	28	11	9	3	3	1	1	1	1	172	157
Wyoming	28	27	13	15	11	6	2	3	2	3	1	1	57	55
TOTALS	**4100**	**4065**	**1027**	**1009**	**576**	**561**	**447**	**448**	**185**	**187**	**149**	**144**	**6484**	**6414**

Terminals Designed for the Air Traveler

Above— Seattle-Tacoma's new terminal building.

THE AIR traveler in 1949 began to get a better break from airports in many parts of the nation.

In city after city, airport terminal buildings that either had never been adequate or had ceased to be adequate gave way to modern structures that were at the same time handsome, commodious and functional.

These new terminals ranged in cost from a little over $100,000 to $4,000,000, but in each instance they provided the passenger with more comfortable waiting facilities, improved baggage handling, and easier access to planes and limousines. Construction was started on a number of other new terminals during the year, and still others were in the planning stage.

Among the Smaller Cities—Malone-Dufort, Malone, N. Y.

International— Buenos Aires' Ministro Pisterini Ariport.

Below— South Bend, Ind.

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Chicago Tops in Airline Movements

Air carrier activities at 25 leading terminal-type airports last year rose 8.9% from 1948 figures and exceeded 40% of total landings and takeoffs for the first time.

At 21 of the 25 airports, air carrier aircraft movements were higher than the year before, and at 18 of the 25 fields the 1949 ratio of air carriers operations to total flight operations was higher than that of 1948.

Air carrier plane movements at the 156 airports where the Civil Aeronautics Administration operates control towers totaled 3,713,257 last year, this representing 22% of operations by all types of aircraft using the fields. The airline traffic showed a 14% gain over the year before, when landings and takeoffs of scheduled transports totaled 3,257,941, or 17.7% of total traffic.

Of particular significance in the overall airport traffic picture for last year was a 25.6% decrease in landings and takeoffs of locally based civil aircraft, which accounted for 7,724,373 movements at the 156 airports last year as against 10,376,869 in 1948. Such traffic accounted for 56.4% of total landings and takeoffs in the latter year, and only 45.6% last year.

This decrease in activities of locally based civil aircraft reflected a decline in pleasure or sport flying and in flight instruction, due largely to declining enrollments in GI flight training programs.

Locally based military aircraft made 1,689,420 landings and takeoffs or 9.9% of last year's total traffic, as against 1,522,099 movements and 8.3% in 1948. Itinerant military aircraft accounted for 1,090,839 movements or 6.4% of the total, as against 727,016 movements or 4% of the total traffic last year. Itinerant civil (non-airline) planes made 2,721,925 landings and takeoffs last year, or 16.1% of the total movements, as compared with 2,499,421 movements and 13.6% in 1948.

For the second consecutive year, Chicago led the nation's airports in air carrier landings and takeoffs, but La Guardia Field gained sharply.

Chicago had 144,169 air carrier plane movements last year as against 138,174 in 1948, and La Guardia had 143,791 last year as against 128,530 the year before. Detroit's Willow Run Airport, which was in fifth place in 1948, dropped to seventh place last year.

Two new cities, Louisville and Columbus, moved into the list of the top 25 airports from the standpoint of air carrier activities. Two others from the 1948 list, Baltimore and Burbank, failed to make the top 25 last year.

Aircraft Operations at 25 Leading Airports*

(1949 compared with 1948)

1949 Ranking	Air Carrier Operations	% of Total Operations	1948 Ranking	Air Carrier Operations	% of Total Operations
1. Chicago (Municipal)	144,169	64.7	1	138,174	62.7
2. La Guardia	143,791	78.1	2	128,530	81.7
3. Washington	126,013	72.8	3	114,168	70.6
4. Los Angeles	97,682	54.0	4	86,051	51.7
5. Miami	93,920	44.4	6	79,225	42.3
6. Pittsburgh	85,935	41.6	7	77,674	51.1
7. Detroit	85,408	77.1	5	81,138	73.9
8. San Francisco	78,332	61.1	9	75,927	57.3
9. Cleveland	76,215	23.9	8	76,512	17.4
10. Dallas	70,835	48.9	11	65,325	51.4
11. Philadelphia	69,455	53.1	14	59,098	63.0
12. Boston	66,734	62.1	12	62,731	55.4
13. Newark	65,370	59.5	13	60,680	54.2
14. Kansas City	61,861	30.9	10	66,078	27.6
15. Atlanta	61,846	33.1	16	52,588	15.5
16. Jacksonville	57,277	43.5	20	44,844	43.5
17. St. Louis	52,780	21.6	15	56,507	24.2
18. Oakland	52,109	20.7	18	45,692	18.7
19. Minneapolis	51,488	21.9	22	37,572	15.8
20. Denver	47,204	29.7	19	45,163	25.1
21. Louisville	44,226	44.0	27	34,249	44.7
22. Indianapolis	43,262	23.3	23	37,370	13.4
23. Cincinnati (Covington)	43,018	56.1	17	45,693	43.2
24. Houston	41,989	40.3	24	34,518	32.5
25. Columbus	40,499	15.9	25	34,341	13.1
TOTALS	**1,801,418**	**41.3**	..	**1,655,265**	**33.8**
Totals for all CAA towers in 1949	3,713,257	22.0		3,257,941	17.7

* Landings and Take-offs.

U. S. Airline Map—1950

•

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OFFICIAL AIRLINE GUIDE

139 North Clark Street

Chicago 2, Illinois

Mushroom Growth in '49 . . .

Hertz, Avis Push Airport Car Rentals

By KEITH SAUNDERS

ONE of the significant developments of 1949, so far as airline traffic and sales and passenger service departments were concerned, was the mushroomlike growth of plane-auto travel arrangements.

This service, not new but until last year not extensively developed, makes it possible for the air traveler to have awaiting him at his destination airport an automobile that he can rent for a rather reasonable charge.

To the airlines, this represents a new and useful sales tool, and to the traveler it represents a sometimes badly needed service and an additional inducement to travel by air.

The 1949 growth of this business, which saw it spread to most of the principal airline route points in the country, came about through a combination of several factors:

1. **A rising curve of airline passenger** business gave operators of rental automobiles a greater incentive to cater to this type of business.
2. **The largest company** in the business, the Hertz Driv-Ur-Self System, of Chicago, stepped up its airport rental service and spent a lot of effort and money promoting the Plane-Auto Travel Plan.
3. **A comparative newcomer** in the field, the Avis Rent-a-Car System, moved into high gear with an aggressive campaign of selling airline sales departments on its service to passengers.

Started At Miami

There are a few others in the field, but Hertz and Avis have an overwhelming preponderance of the car rental business at airports.

Warren Avis is a successful Detroit Ford dealer. He ventured into the car rental business in 1946 at Miami International Airport, feeling that airline passengers would welcome this means of eliminating the costly loss of time and the inconvenience of traveling by limousines, taxis and other public conveyances after arrival at their destination cities.

When the Miami venture proved successful, Avis branched out into other airports, using the franchise or licensee system at all but a few. His company hit its stride in 1949, when 55 new cities were added to the system, boosting the total to 76. More cities have been added since. At only a dozen or so of these cities do the Avis licensees have rental cars available at the airports. At the other points, the automobiles are based at downtown locations and are dispatched to the airports to await the arrival of passengers who have requested them.

The Avis company itself owns about 150 automobiles, nearly all Fords or Mercurys, most of which are based at the company-owned stations at Miami International and Detroit's Willow Run Airport. No figures are available as to the number of cars operated by its licensees, but it is considerable.

Airport Auto Station—This garage, located at 5511 S. Cicero Avenue, Chicago, is the Hertz Driv-ur-self System station at Midway Airport. Hertz has 25 rental cars at this location and reports that they all stay busy. The garage, owned by Continental Air Transport Company, is just a block from the passenger terminal building.

Sells Cooperative Deals

Avis' forte has been in selling cooperative arrangements with the airlines as a means of boosting their short-haul business, primarily, and it has such arrangements with about a dozen airlines, including United, American, Eastern, Capital, and National.

Several of these have consented to use their landline communication facilities to relay auto reservations requested by a passenger to their destination airport offices, which in turn relay the messages to the local Avis agency in order that the passenger's car may be awaiting him upon arrival. Where the Avis agency is downtown, the car will be delivered to the airport and may be left there by the passenger at no extra charge.

Avis rates, which are more or less standard, are a maximum of $6.00 per day plus 8c a mile, which includes gas, oil and insurance. A Universal Air Travel Card automatically establishes credit with the Avis licensee and also obviates the necessity for putting up the usual $20 per day deposit.

24 Airport Agencies

Much better known than the Avis organization is the long-established Hertz Driv-Ur-Self System, which has agencies at 24 major airports, including Chicago, Boston, Pittsburgh, Cincinnati, Baltimore and Atlanta, and serves approximately 450 other airports from downtown locations. It supplies the cars, mostly new Chevrolets (it is a wholly-owned General Motors subsidiary), and supervises the rental activities of the authorized Hertz operator or agency.

Hertz had begun to work with the airlines just before the war in the promotion of the Plane-Auto Travel Plan to the traveling public, but the business naturally was crippled during the war years. Rebuilding slowly after the war, it was not until a year or so ago that the company was prepared to move aggressively into the development of this type of business. It now reports enthusiastic acceptance of the service by airline passengers in most of the cities served.

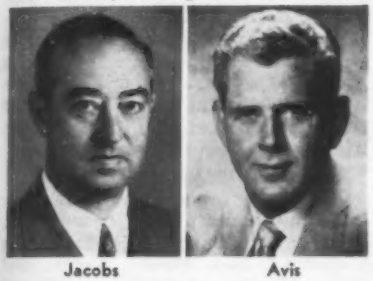
For example, Hertz opened its airport operation at Chicago Municipal

only last November, operating five automobiles there through its agent, Continental Air Transport Co., which operates the airport bus service and has a large garage at the airport. Today there are 25 Hertz cars at that location, and all are kept busy. This one station did a 5-figure business in February, and possibly did even better in March.

The Hertz charge at most locations is $5 a day plus 7c a mile, which is better than the Avis rates. Also, it requires only a $15 per day deposit, instead of the $20 required by Avis.

Uses National Ads

Whereas Avis has concentrated on cooperative arrangements with the airlines, Hertz has centered its efforts on the over-all promotion of plane-auto travel, feeling that the number



Jacobs Avis

of locations it has will assure it of a sizeable percentage of all such business generated.

To this end, it has run extensive national advertising in such leading magazines at *Life, Look, Holiday, Time, Newsweek* and the *Saturday Evening Post,* telling the traveling public about the advantages of using the airplane for speed in inter-city travel and using a rental car for convenience in the city of destination.

However, Hertz also is working closely with airlines in the promotion of plane-auto travel. It has furnished to the airlines free of charge over 2,000,000 advertising leaflets bearing their individual imprints, plus thousands of stuffers, counter cards and other promotional literature. Just now, Hertz officials are engaged in trying to sell the airline industry on the importance and desirability of more actively "pushing" plane-auto travel through their sales staffs.

"We think the airlines realize by now that the railroads and bus lines are not their major competition," said W. L. Jacobs, president of Hertz. "The big competition today comes from the private automobile. Of the estimated 570 *billion* passenger miles of inter-city travel last year, only about 7,000,000,000 passenger miles were accounted for by the airlines, while the private automobile accounted for close to 500 billion."

Jacobs said it was gratifying to him and to his company to see more and more airlines coming around to this point of view and recognizing what the availability of rental autos at airports can mean to them.

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"We selected attractive, durable GLIDAIR finishes for complete redecorating of all our aircraft"
"Interiors of general offices beautifully decorated with one-coat Glidden paints . . . and at considerable savings in time and materials!"

An airline talks paint economy and performance...

The enthusiastic comments shown above are excerpts from a letter written by Chicago and Southern Airlines. Having recently standardized on Glidair Finishes and Glidden Paints, they were interested in evaluating the savings and superior performance they had obtained. In addition to the statements above, Mr. R. L. Anderson, Director of Research and Development, had this to say:

"Despite flights through salt air over Houston, New Orleans, Havana, as well as Jamaica and Venezuela, Glidair finishes hold their gloss longer than any others we have used.

"We have found that Glidden finishes excell all others and we are appreciative of the low end cost and high quality of your products."

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GLIDAIR

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In Point of Service . . .

Who Is Oldest Airport Manager?

By WAYNE W. PARRISH

In my "En Route" page of the January 15 AMERICAN AVIATION I mentioned a number of old-time airport managers and asked for help in locating the nation's No. 1 airport manager in point of service. The response wasn't long in coming in.

But selecting a title-holder isn't the easiest job in the world.

Under one set of rules the title would go to **Jack Berry,** commissioner of airports for Cleveland, and one of the most beloved men in aviation. Jack was loaned by the Air Mail Service to the City of Cleveland on May 1, 1925. He was commissioned by the City on March 1, 1926. But Jack resigned his post and was away from Cleveland for about a year and a half and this break might disqualify him from the title.

Class of '27

If so, then the record may go to **John A. Casey,** Supervisor of Operations and Airports, Bureau of Aviation, Dept. of Public Works, Chicago. Jack Casey began his aviation career at the age of 18 in 1919 as flying mechanic, crew chief and ass't station manager of the Air Mail Service which operated from the airport in Grant Park at the foot of Randolph Street on the lake shore. About the middle of 1927 he went with the city of Chicago in the job he now holds. He began flying in 1926 and has logged about 5,000 hours.

There are four others, however, who date back to 1927:

A. H. Abel, port manager and chief engineer of the Port of Oakland, Calif., who was named assistant port manager and assistant engineer on March 1, 1927 when work was started readying the Oakland field for the historic Maitland-Hegenberger flight to Hawaii. He was elevated to his present position on Feb. 7, 1933.

Charles Short, airport manager at Tulsa, Oklahoma, who was appointed to his present post on July 1, 1927.

F. E. Machesney, owner and manager of the Machesney Airport at Rockford, Ill., who started his present field on June 8, 1927. Machesney had soloed at Sikeston, Mo., under Jim Faulkner in October, 1919 and operated a field at Kewanee, Ill., until he opened up the Rockford airport.

Frank J. Geng, airport director of Holman Field, St. Paul, Minn., who has been on the job since August 28, 1927.

Frank, incidentally, kept the early records of the Airport Executives Association (now the American Association of Airport Executives) back in 1928, and has provided me with interesting information on the first meeting.

E. A. Johnson of Dayton was elected president at the organizational meeting held at Mines Field, now Los Angeles Municipal, on September 13-15, 1928. **Bill Fuller,** who served for 18 years as manager of Fort Worth's Meacham Field before joining CAA three years ago, was secretary.

Two in '28

Then come two managers who date to 1928.

One is the popular **B. E. "Shorty" Fulton,** manager of Akron Municipal Airport, Akron, O., who was appointed by the city to manage the field in 1928. But in 1924 Shorty bought an old farmhouse, a couple of lots, squatted on other land and started Fulton Field. He had his own ships, hopped passengers, did instructing and as he says "did about anything to make a couple of nickels." His commercial pilot's number is 2086. During the late war he was in the Air Force developing air bases except when he was a POW.

Oscar N. Barney, airport manager for the City of Mobile, Ala., who was appointed to the job Aug. 1, 1928. (Thanks to Orville Winover, supervising agent of the CAA, second region, for calling this to our attention).

1929

I have two entries for 1929. One is **Mrs. C. E. Kolp,** manager of Electra Airport, Electra, Texas, ever since April 7, 1929. The other is **Woodruff De Silva,** airport manager for Los Angeles, who became assistant director of the airport in March, 1929.

There are others who date 'way back but haven't been heard from, such as **Nat Duffy** of Buffalo, **Jack Tweed** of New Haven, Conn., and **Wayne Parks** of Beaumont, Texas, although Parks has not served continuously in one place. If readers know of any others dating from the period prior to 1929, let's have 'em.

Among Airport Veterans . . .

Berry — *Cleveland—1925*
Casey — *Chicago—1927*
Abel — *Oakland—1927*
Short — *Tulsa—1927*

Machesney — *Rockford—1927*
Geng — *St. Paul—1927*
Fulton — *Akron—1928*
Barney — *Mobile—1928*

Surely your air line can use this added revenue!

HERTZ... and only HERTZ can offer all the advantages of the

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Driving their own cars, traveling between cities, Americans covered 570 billion passenger miles during 1949! A large number of these drove long distances not because they wished to, but simply because they wanted and needed cars when they reached their destinations.

In a short time thousands of car owners have been diverted to plane travel from long distance driving by the Plane-Auto Travel Plan . . . which is a plan of co-operation by the Hertz Driv-Ur-Self System and air lines. And no wonder, when you realize that now travelers can reserve a new car from Hertz before they leave home in over 450 cities throughout the United States, Hawaii, Cuba, Great Britain and Canada, and be sure that the car will meet them at the airport, if desired, filled with gas and oil, properly insured, all ready to go! *And at surprising low rates.*

Hertz . . . and *only Hertz* . . . tells the traveling public the advantages of the Plane-Auto Travel Plan thru national advertising in such leading magazines as the Saturday Evening Post, Life, Look, Holiday, Time, Newsweek, and U. S. News & World Report.

Are you telling your customers about this great traffic-building plan? At every counter, have you a counter display? If not, send for them now, they are free, they will help you to sell your passengers, and render a worth-while service. That the great traveling public wants this service has been proved . . . proved by ever-increasing interest, ever-increasing use of the Plane-Auto Travel Plan.

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So successful has the Plane-Auto Travel Plan proved that Hertz has opened a score of auxiliary stations at airports and will open others as rapidly as required. Remember, you can reserve cars from Hertz—and *only* Hertz—in more than 450 cities including virtually all pleasure resort areas, throughout the U. S., Hawaii, Cuba, Great Britain and Canada! So, to increase your air line revenue, advertise, promote, sell the Plane-Auto Travel Plan. Write for further information, or materials you may need. Get your share of this growing business.

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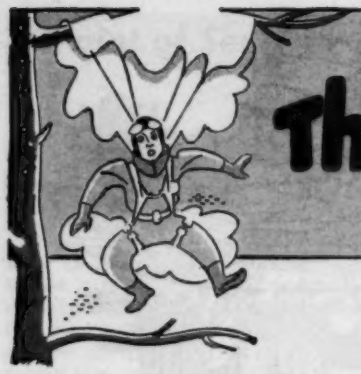
Chicago 4, Illinois



The Birdmen's Perch

"We're lost!" the Captain shouted.

Unless you're one of those eccentric buzz-boys who enjoy an emergency landing in somebody's pea patch, those words should scare the be-jeepers out of you.

It gets you right under the safety belt, as they say, and it ain't good. Yet, plenty of otherwise good flyers, who don't know their navigation from a hole in the ground, just plain go out and "get lost."

Take the average lightplane pilot who flies without radio help. He's a demon at following a four-lane highway on a clear day, but throw in some poor visibility and it's another story. And—even if he sports the latest in radio equipment, a fuse can blow his set deader than a herring.

There's only one answer—practice your navigation! Keep your technique "fresh" and there's no reason for you to ever get lost or miss your destination.

And Speaking of Destinations...

One of your regular destinations should always be the source of that scintillating super-lube, Gulfpride Aviation Oil—Series D!

Modestly enough, it's the world's finest detergent dispersant oil for horizontally opposed engines because—it's the only lightplane oil put through Gulf's exclusive Alchlor process to remove extra carbon and sludge formers!

If your plane has the nasty habit of crying like a baby when you wheel it out of the hangar, all the little fellow needs is a shot of Gulfpride Aviation Oil—Series D—to free those sticky valves and rings.

And . . . you'll increase those periods between overhauls up to 100%!

Little Known Facts Dept.

And now, students, if you can tear your eyes away from "Smiling Jack" for a

minute, the Dean has an important honor to confer. Will Mr. Leonard King of Adrian, Mich., step forward, please.

Mr. King, your Little Known Fact About Well Known Planes has been carefully scrutinized by the faculty and termed not only appropriate, but highly sensational. Therefore, with the powers invested in me by goodness knows who, I commission you as Perch Pilot (bottom rung)! If the student body will now rise, I shall read the Little Known Fact, submitted with PROOF!

"It was just twenty years ago that Jim Doolittle made the first instrument landing under the hood at Mitchel Field and proved that it was possible."

Ah pioneers, oh pioneers! Nice work, Leonard! Now suppose you tell the other boys and girls how proud you are of the new diploma and just how easy it was to dig up that L. K. F.

Don't remain unsung forever. Send your Little Known Fact About Well Known Planes—with PROOF—to this address:

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All the Way by Air

. . . goal of airlines, fixed-base operators

By B. J. WARD

AIR TRANSPORTATION may soon be extended beyond the major airline terminals to many small communities which have a Class I airport, through the newly organized National Air Taxi Conference. The NATC, formed in February, 1950, by a small group of fixed base operators, is taking initial steps to organize the unscheduled charter flight operators to provide rural air linkage with airline flights.

For the first time, the major airlines and the fixed base operators are getting together on a large scale plan to enable passengers living in small communities to make reservations for airline travel at their local airport and to be flown in a small plane to join their airline flights; likewise, on the return trip, the air connection will be provided between the airline terminal and the community airport. It will be possible to "go by air all the way."

The proposed NATC plan for air taxi service is slated for consideration by airline representatives at the meeting in Miami, April 27-28, of the Air Traffic Conference of America. One of the main problems to be solved at that time will be providing insurance coverage on both the airline and air taxi portions of a trip.

Insurance Required

In general, it appears that the air taxi operator will be required to carry public liability, property damage and passenger liability, with emphasis on passenger liability; NATC has requested the advice of the insurance companies on this subject. A Hold Harmless clause is being worked out to protect both the airlines and the air taxi operator when a through ticket is sold by one agency on the other's flight service. Another problem to be faced is that of allotment of agent commissions where a through ticket is sold.

Integration of large and small aircraft into one transportation picture may mean the difference to many travelers between a railroad ticket and an airline ticket. It takes less than three hours to fly to Chicago from La Guardia Field, but if the passenger lives in Somerset, New Jersey, it takes over three hours to get to La Guardia by surface transportation. A Beech Bonanza, however, can make the trip in about twenty minutes and will have an added appeal when taxi service is planned for the times of airline departures.

A parallel need for air taxis is developing in large cities. The large planes are getting larger and, due to metropolitan land prices, the major airline terminals are being located farther and farther out of town. This is true of Idlewild Airport at New York, Friendship International Airport at Baltimore, and Willow Run at Detroit.

NATC plans to initiate air taxi service to some airline terminals in May or June. Joseph Garside, NATC president, states that a limited number of "guinea pig" operators will start services in selected areas which will give the NATC a varied picture of operating conditions and the effectiveness of promotional ideas.

Members of the organization are now being contacted to ask whether they would be interested in "test hopping" the air taxi operations. After an operating nucleus is established and operating procedures are worked out, NATC will drive to expand its membership and provide air taxi service on a wide scope.

Although NATC members had originally decided on use of four-place aircraft as standard air taxi equipment, airline representatives have made an informal recommendation that two- and three-place aircraft also should be used. This allows short haul economy where only one passenger is involved.

To assure a high standard of membership, a surety bond will be taken out by NATC on each applicant for membership. This will require investigation and approval by the bonding company in establishing a fixed base operator as an NATC member.

In addition, a "Code of Operating Practices and Ethics" must be subscribed to, met and maintained by all members. A tentative code, which establishes minimum operating requirements, has been drawn up and now is being circulated to all members for comment. In general, the code will stress safety to the extent that members must be able to prove the negative—that any possible charge of negligence in operations can be disproved. High standards will be set for airport facilities, provision of lounges and rest rooms and passenger handling.

Compliance will be required with refueling procedures, ramp area precautions, and inspection and maintenance

National Air Taxi Membership

Charles Del Sordo, president, Ames School of Aviation, Inc., Easton, Mass.

W. R. Ashburn, Ashburn Flying Service, Inc., Alexandria, Va.

W. H. Blakemore, Atlantic Aviation Service, Inc., Wilmington, Del.

Titus P. Matouswicz, Aviation Service Company, Brainard Field, Hartford, Conn.

P. Brock Minor, Cavalier Aviation, Inc., Northfield Airport, Richmond, Va.

Edward Garbacz, Central Flying Service, Adams Field, Little Rock, Ark.

Arthur Currey, president, Currey Flying Service, Inc., Galesburg, Ill.

John T. Griffin, president, East Coast Aviation, Inc., Bedford, Mass.

R. M. Smith, president, Echelon Aeronautical Service, Haddonfield, N. J.

C. S. Ireland, Grossinger Airport, Liberty, N. Y.

Thomas Robertson, Hadley Aircraft Inc., New Brunswick, N. J.

Joseph W. Hance, Hance Flying Service, Hance Airport, Wyandotte, Mich.

Beverly Howard, president, Hawthorne Flying Service, Inc., Charleston, S. C.

James Wathan, manager, Hunter Flying Service, Inc., Cedar Rapids, Ia.

B. J. Holleman, president, Jacksonville Airport, Inc., Jacksonville, Fla.

Everett King, manager, King Aviation Service, King Airport, Taunton, Mass.

W. M. Post, Jr., president, Lehigh Aircraft Company, Allentown, Pa.

Maurice W. Price, manager, Mallard Air Service, Inc., Teterboro, N. J.

Charles P. O'Connor, O'Connor Aircraft Company, Albany Airport, Albany, N. Y.

William Wilmot, Page Airways, Inc., Rochester, N. Y.

R. S. Northington, vice president, Piedmont Aviation, Inc., Winston-Salem, N. C.

W. R. Landenslager, president, Red Bank Airport, Red Bank, N. J.

Clay S. Swain, Salisbury Aircraft Service, Salisbury, N. C.

Samuel Freeman, president, Somerset Air Service, Inc., Bedminster, N. J.

W. Clayton Lemon, general manager, Virginia Airmotive, Woodrum Field, Roanoke, Va.

Joseph Garside, president, E. W. Wiggins Airways, Inc., Norwood, Mass.

Guy Miller, Wings, Inc., Philadelphia International Airport, Philadelphia, Pa.

Martha Anne Woodrum, Woodrum Flying Service, Woodrum Field, Roanoke, Va.

Oscar L. Hastotter, York Airport, York, Pa.

Headquarters

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. . . for "off-the-shelf" shipments within 24 hours! Airwork maintains complete inventories of factory-new parts and accessories to give you prompt shipment—whatever your order, *large or small*. And our staff of sales engineers are especially trained to screen orders and advise on engine modifications, parts interchangeability, and power plant problems—your insurance against superseded parts . . . obsolescent parts . . . overstocking.

In addition, Airwork's exceptional production-line overhaul facilities for Pratt & Whitney and Continental E-185 engines assure you the same high quality work that has enabled airline operators to get time extensions of as much as 55% on operating time allowed by CAA between overhauls!

That's why you should send it to Airwork—headquarters for overhauls—accessories—spare parts.

Airwork Corporation distributes the following aviation products: American Brass, Bendix Products Division, BG, Champion, Continental, Jack & Heintz, Packard Cable, Pesco, Pratt & Whitney, Romec Pumps, Thompson Products, Titeflex, Turco Products, and U. S. Rubber.

ONE OF *THE* FOUR

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nance plans. Member operators will have to guarantee that employees will receive adequate supervision and that they are indoctrinated in safe practices. Pilots must take advantage of all existing ground and air communication facilities wherever practical.

The indications are that, while the NATC has the potential of developing into a far-flung local air service, reaching well over a thousand communities, it will be closely regulated within and by its own organization.

Publicity Value

Provisions for advertising NATC air taxi flights are being worked out. An NATC insignia is being designed and the desirability of a passenger folder to describe air taxi service benefits is under consideration. From the viewpoint of the individual fixed base operator, NATC holds immense publicity and community prestige value as it will make him the air transportation representative in his town and connect his name with airline and NATC flight advertisements.

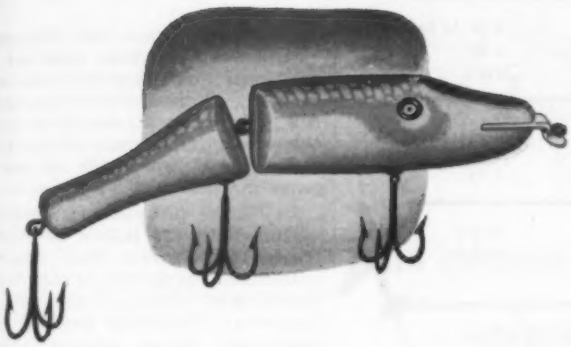
NATC membership consists of three classes: regular, associate and contributor. Voting privileges are confined to regular members, who must be members of the National Aviation Trades Association, and an additional connection with NATA is provided by the provision that the NATC president will automatically become NATA vice president of transportation.

Any small irregular air carrier who holds a proper CAB letter of registration and a CAA operating certificate may, on payment of an application fee of $25.00 and yearly dues, and on agreement to abide by the code of operating practices and ethics, become a regular or associate member. Each member air carrier must submit a copy of its letter of registration and operating certificate and must appoint as its NATC representative its chief executive or general manager.

Officers Elected

NATC has three elected member officers who serve one year terms. Officers elected in February are: Joseph Garside, of Norwood, Mass., president; Robert Northington, of Winston Salem, N. C., first vice president; and Samuel Freeman, of Somerset, N. J., second vice president. A fourth officer, the executive vice president, will act as NATC administrative officer with his headquarters in Washington, and will be appointed when operations have been established to justify his full time activity.

Regular meetings of NATC will be held at least once each year and special meetings may be called by the executive committee or on request of a majority of the regular members.



Some sage once observed that most fishing lures seemed to be designed to catch the fisherman and not the fish . . .

Equally true of trade magazines, the best advertising medium is a magazine written to serve the reader, rather than to impress the advertiser.

Amid the statistics, surveys and claims confronting the advertiser, one indisputable fact stands out—advertising value is measured by advertising readership among present and potential customers.

how do you recognize a good trade magazine?

IS IT A MEMBER OF A.B.C.? There is no substitute for paid circulation. AMERICAN AVIATION's readers think enough of the magazine to *pay* for it. The complete, authentic information it supplies its readers is worth paying for.

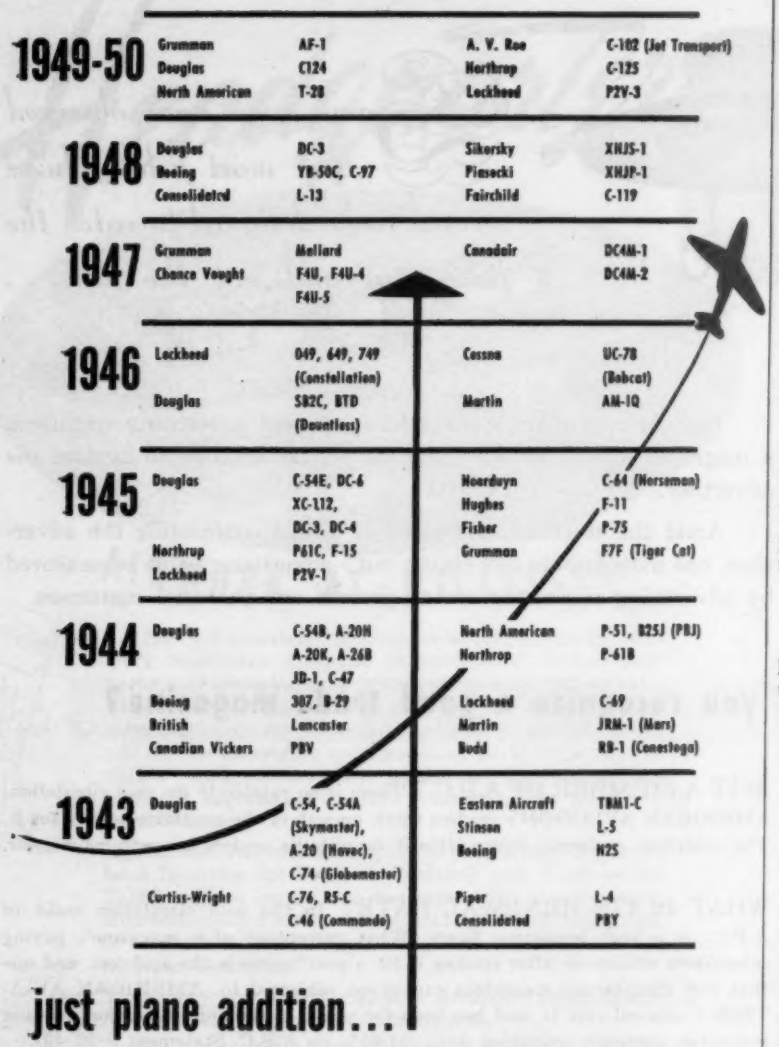
WHAT IS ITS RENEWAL RATE? In the paid circulation audit of A.B.C. is a very important figure. What percentage of a magazine's paying subscribers *resubscribe* after reading it for a year?—this is the acid test, and one that free distribution magazines cannot be subjected to. AMERICAN AVIATION's renewal rate is, and has been for years, highest of any major aviation magazine, currently averaging 55% (51.05% on A.B.C. Statement 6-30-49).

IS ITS MAJOR EMPHASIS ON READER SERVICE OR ON SELLING? Every trade magazine has only so much money to spend on staff salaries. Look at the mastheads and see which magazines spend most of their money on selling advertising, which on full-time editorial staff to provide readers with better service. AMERICAN AVIATION's editorial staff is the largest in aviation publishing. It has won more national awards for editorial excellence than all other aviation magazines combined.

Careful editorial readership by responsible, influential aviation people guarantees maximum advertising readership.

American Aviation **IS STILL GROWING**

1025 VERMONT AVENUE • WASHINGTON 5, D. C.



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. . . points to unquestioned leadership of Janitrol heaters. There's no better proof of performance than the long list of fine aircraft which are Janitrol-equipped . . . For the smallest or the largest airplane—for all heating requirements—in flight, or on the ground—Janitrol heaters will live up to the severest specs. They're as compact, as lightweight, as sturdy, and as dependable as modern engineering can make them. You'll be well advised, whatever your heating problem, to call in your nearest Janitrol representative early in the design stage. A phone call will put him at your service.

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Air Star Routes to

ALTHOUGH the Post Office Department last year received Congressional approval for the establishment of an unlimited number of Air Star Routes in the U. S. for the carriage of all classes of mail, only a small start was made on the program in 1949.

This slow progress, however, was in line with the policy of Assistant Postmaster General Paul Aiken, an enthusiastic supporter of the Air Star Route law. (Public Law 277, 81st Congress). Following passage of the legislation, Aiken warned that a large number of routes would not be established immediately.

"I propose to approach this problem cautiously," he said last September. "I will be well satisfied with progress if from one-half dozen to a dozen exist a year from now. I propose to be as careful and as slow as necessary to be absolutely sound."

Two in Operation

At the present time, the Post Office has two Air Star Routes in operation under the new law. They are:

1. From Charlevoix to St. James, Mich., 35 miles, three round-trips weekly from Jan. 1 to Mar. 31 of each year. Contractor is Joseph A. McPhillips, 309 Nettleton St., Charlevoix, Mich. He is paid 38c per airplane mile for a base load of 500 lbs. plus 15c per airplane mile for each 100 lbs. in excess of this load. The contract expires June 30, 1951.

2. From Honolulu to the leper colony at Kalaupapa, Hawaii, 54 miles, six trips weekly. Contractor is H. C. Cockett, 1517 Leilani St., Honolulu. Pay is 15c per airplane mile for a base load of 500 lbs. plus 2¾c per mile for each 100 lbs. of excess. Contract expires June 30, 1950.

Both McPhillips and Cockett are fixed-base operators—the group that is expected to receive the most benefit from the new law.

In addition to these two services, there is also an Air Star Route in operation that was awarded under the old star route law. It runs out into Lake Erie from Port Clinton, Ohio, to Kelley's Island, Put-in-Bay, Middle Bass and Isle St. George, returning via Middle Bass and Put-in-Bay to Port Clinton, 22.8 miles, six times weekly. Contractor is Air Tours, Inc., Put-in-Bay, Ohio. Under the contract, which expires June 30, 1951, Air Tours is paid 92c per airplane mile for a base load limit of 250 lbs. plus 1c per mile for each 20 lbs. of excess.

Routeff to Slow Start

Reason for the varying expiration dates in the contracts is because under the Post Office set-up, the U. S. is divided into contract regions. Star route contracts, surface and air, run for four years, and all contracts in a particular region expire on the same date. For example, in the Michigan district the regional expiration date is June 30, 1951, at which time all contracts in the region will be re-advertised on a four-year basis. When the Lake Erie contract expires, it will be re-advertised.

What expansion of the Air Star Route program will occur in 1950 remains to be seen. Post Office officials are willing to advertise new routes when necessary conditions are met.

These conditions include: (1) the route shall be found to be in the public interest because of the impracticability or inadequacy of surface transportation, and (2) the cost shall be reasonably compatible with the service to be provided.

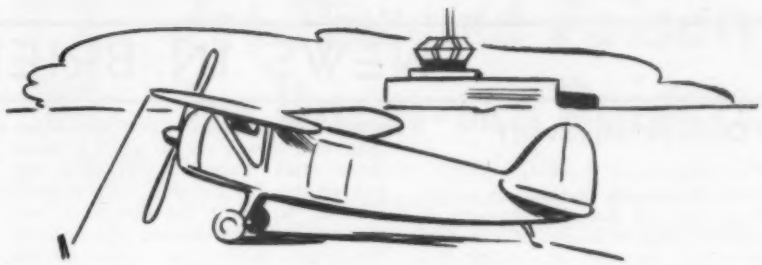
Cost Factor Vital

On the latter point, Aiken has said: "It must either cost less or not more than existing surface transportation, or if it does cost more it must provide us with sufficiently greater speed that a slight increased cost would be justified."

Somewhat surprisingly, the Post Office has met with some objections to the establishment of Air Star Routes. In the Snake River country of Idaho, for example, the residents took a dim view of the possibility of an air route replacing their boat mail service. The reason was that they depend on the boat for shipment and receipt of heavy materials that can't be carried by plane. And if the boat operator's mail contract were canceled, he would have suspended service.

Therefore, the principal task now before the Post Office is to find the proper locations for Air Star Routes. To accomplish this, the assistant general superintendents of air mail service in the 15 postal divisions throughout the U. S. have been requested to survey their territories and report promising locations to Washington headquarters.

How many Air Star Routes will eventually be established is, of course, not known. Two years ago, Aiken talked in terms of 50 to 100 over a considerable period of time (at present, there are 11,324 surface star routes and 134 power boat routes in the U. S.). There is little doubt that the survey will turn up some desirable locations, and Aiken's timetable of six to 12 routes in operation by year-end probably will be met.



This plane costs you *plenty of dollars* each year!

INDIVIDUAL T-HANGARS. Ideal for limited area. Durable construction, economical.

MUL-T HANGARS. Sturdy, profitable housing, quickly erected at low cost. Bi-fold doors.

STEEL-MASONRY HANGARS. Clear floor space, ample ceiling height, easy access, light, and ventilation.

ALL-STEEL COMMERCIAL HANGARS. Every size and type . . . standardized or special design . . . to fit your airport.

Every plane staked out overnight at your airport costs you money if you don't have the hangars to put them in.

The income from an installation of International Steel hangars at your airport will pay for much of your operating costs in future years.

International Steel hangars — ranging from T-hangars to large shop hangars — can be built to your specifications — to fit your exact requirements — quickly and economically. And they will pay for themselves in a short time!

At airports throughout the country . . . in all types of weather and winds . . . International hangars have proved their durability, their versatility, their value to any airport.

Get the planes at your airport off the field and into an International Hangar.

★

Eight 6-Ship Mul-T Hangar Buildings from International Steel bring revenue to the Miami Valley Flying Service at South Dayton Airport, Dayton, Ohio.

Write Today . . .

for complete information — how you can increase the income of your airport. We will be glad to submit suggestions . . . at no obligation to you.

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NEWS IN BRIEF

AF Outlook Improved?

The nomination by President Truman of Thomas K. Finletter as Secretary of the Air Force to succeed W. Stuart Symington is seen by informed Washington sources as constituting the first step toward a change in the Administration's policy of paring Air Force strength.

Defense Secretary Louis Johnson's "economy" program, which, if continued in fiscal 1951 will cause AF strength to drop below the 48 modern group level, has not been a popular one. Finletter gained prominence in aviation during his chairmanship of the President's Air Policy Commission in 1947, which had recommended the immediate establishment of a 70-group Air Force.

John A. McCone, who was also a member of the Air Policy Commission, is slated to become AF Undersecretary.

It is believed the Administration will allow itself to be "convinced" by Finletter and McCone that a stronger AF is necessary.

B. A. Permit for Braniff

The Argentine government has issued Braniff Airways a permit that will permit it to extend its South American route to Buenos Aires from Lima, via La Paz, Bolivia, and Asuncion, Paraguay. This will complete the last segment in Braniff's international route, a segment the company has been unable to operate since its certification in CAB's Latin American route decision in 1946. The company was expected to start flying the route at an early date.

TCA Opens Disputed Route

Trans-Canada Air Lines began scheduled operations between Montreal and New York on April 1, three days after President Truman approved the Civil Aeronautics Board's decision to grant the Canadian carrier a foreign air carrier permit to fly the route under the terms of the U. S.-Canada air transport agreement. The award had been bitterly contested by Colonial Airlines, which claimed it would suffer a diversion of $1,000,000 of business annually. TCA is using four-engined 40-passenger North Star aircraft on the route and is flying three round-trips daily.

Slick's Anti-Trust Suit

Slick Airways on April 3 filed a $30,000,000 anti-trust damage suit against American Airlines, United Air Lines, Trans World Airline, the Air Transport Association and Air Cargo, Inc., charging them with conspiring by unlawful means to drive Slick and other independent all-cargo carriers out of air freight transportation and effect a monopoly of that business for themselves.

The complaint, filed in U. S. District Court in Trenton, N. J., charged defendants with "predatory rate policies," "abuse of the privilege of intervention and participation in CAB proceedings" affecting Slick, use of "unlawful rebates and unlawful rate reductions," and "a campaign of unfair competitive practices." In addition to its regular legal counsel, the Washington law firm of Steptoe and Johnson, Slick has retained the firm of Arnold, Fortas and Porter to help prosecute the anti-trust action.

Air Race Changes

The National Air Race Committee voted to drop the "R" or reciprocating division of the Thompson Trophy Race in the 1950 races to be held at Cleveland September 2-4, and to restrict both that race and the Bendix cross-country race to military jet aircraft. Effect of the ruling is to eliminate from the racing program all surplus and "souped-up" military aircraft such as P-38's and P-51's. The Thompson will be flown over a 100-kilometer course so laid out as to make possible the establishment of an official world's record.

Forwarder Authorization

The Civil Aeronautics Board has authorized international forwarders to operate in foreign and overseas transportation as indirect air carriers for a period of five years and four months. The new regulation, Part 297, provides that international forwarders be limited to the use of certificated U. S. air carriers and those foreign lines holding CAB-issued permits. Would-be forwarders will have to apply for letters of registration, as is the case with domestic forwarders. No limitation will be placed on the number of forwarders to be authorized, but only a "moderate number" are expected to qualify.

Lightplane Shipments

A continued decrease in production of one and two-place personal aircraft and a leveling out in production of business or executive aircraft is reflected in data reported to the Aircraft Industries Association. February shipments of lightplanes (two- to ten-place) totaled 215 units, as against 226 in the same month last year.

Of the total, 56 were one- to two-place aircraft, as against 73 in February of last year, while 159 were four- to ten-place aircraft, as against 153 in the same month last year. Due to price increases, manufacturers' billings were slightly higher this year, $1,175,000, as compared to $1,018,000.

Plane Briefs

Trans World Airline has taken delivery on the first of the 20 new L-749 Lockheed Constellation aircraft it has on order. The plane is being used for pilot indoctrination prior to going into international service. It seats 57 passengers, and the interiors of all of TWA's Constellations are now being restyled and standardized at the line's Kansas City overhaul base.

National Airlines has announced plans to purchase two additional DC-6's for delivery in advance of the

All-Weather Fighter—This is the Douglas F3D Skyknight, a two-place side-by-side all-weather fighter, first fighter to be built for the Navy by Douglas. The prototype model was powered by two Westinghouse J-34 jet engines, but production models will have a more powerful engine. The F3D has an escape chute which drops the pilots below the fuselage instead of the conventional upward-firing ejection seat, and features a novel no-glare instrument panel and consoles.

winter season next year. The two DC-6's previously ordered by National are expected to go into service this summer.

People

Otto E. Kirchner has been promoted from director of engineering at American Airlines' Tulsa maintenance base to system director of operational engineering, with headquarters in New York. He joined the company in 1928, became chief engineer in 1939, was made director of aircraft engineering in 1943 and moved into the Tulsa job in 1947.

Roger Lewis, vice president-sales for Canadair Ltd., since 1948, has resigned to take another position.

Lieut. Gen. Idwal H. Edwards, deputy chief of staff, operations, has been picked to be the Air Force's next vice chief of staff, replacing Gen. Muir S. Fairchild, who died March 17. **Lieut. Gen. Nathan Twining** has been mentioned as Edwards' probable replacement in the operations post.

M. M. "Jack" Frost, vice president of Eastern Air Lines, has been named head of the company's traffic and sales department, taking over the duties of **Stanley de J. Osborne,** who resigned March 1 as vice president-traffic and sales. Frost joined Eastern in 1945 as vice president after three years of active service with the Air Force.

Stanley C. (Jiggs) Huffman, general manager of the Miami All American Air Maneuvers for the past several years and executive secretary of the Greater Miami Airport Association, has been appointed chief dispatcher and Miami division traffic manager for Riddle Aviation Co. He was operations manager for the original Embry-Riddle Co., from 1924 to 1930.

Col. C. V. "Bud" Burnett, manager of Detroit City Airport since 1934, has been appointed director of the new Detroit Aviation Commission. **Wes Walker,** field superintendent for a number of years, has been named acting airport manager.

William B. Brock, 42, assistant to J. C. Ray, Eastern Air Lines general superintendent of maintenance at Miami, died March 26 of a heart attack. He joined EAL's engine overhaul department in 1935, became assistant to the superintendent of engine overhaul in 1944 and three years later was promoted to the position he last held.

David Chapin Beebe, chairman of the United States Aviation Underwriters, died of a heart attack at his home in Englewood, N. J. A World War I flyer, he founded the aviation insurance company in 1928 in partnership with Reed M. Chambers and became its first president, moving up to board chairman in 1944.

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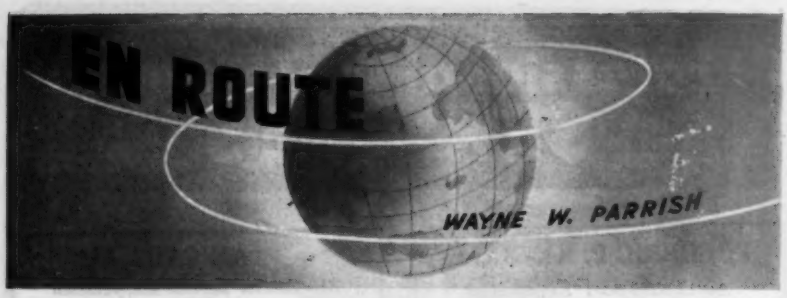


Airfleas. On the occasion of our special Air Transport Progress issue I interrupt the current series of rambles in Europe to pose a serious question.

I have never been one of those who thought that the airplane was, by itself, a means of obtaining world peace. The railroad network in Europe never kept the peace there, so why should the airplane, which is in essence just another transport vehicle, bring peace to the world?

But during the past year of hopping about I have sensed that the transport plane is doing a lot that no other transport medium has ever been able to do to unify the world. Since World War II the airplane has created a new group of people of various nationalities—a small but growing super-population of airfleas—to coin a name for them—who, while individually having their own national citizenships, are actually citizens of the world.

I want to make my point quite clear. I am not discussing any ideological concepts or political "one worlds." Nor do I think that tne mere transportation of quantities of "tourists" to other lands is any great vital contribution to future world peace. You can't force real unification by ideological crusades or arbitrary political ties. Unification will come when national boundaries and barriers become a mockery, or when they become as impotent economically as a county boundary within the United States.

Here is what I am driving at: A new "international set" has been created,

Unification by transport . . .

consisting of roving diplomats and government representatives, editors and writers, business men and salesmen, and aviation people of all kinds, who flit from country to country and continent to continent with a casualness, an ease and a familiarity entirely unknown before the last war—and never possible until the trans-ocean airplane got into service.

✣ ✣ ✣

Anywhere Is Home. This group is as much "at home" in one country as another. Except for minor immigration and customs nuisances and red tape, they are quite oblivious to national boundaries. And this may be of utmost importance. Unlike the prewar travelers, they rarely see or stop at a national boundary—they flit from

Oblivious to borders . . .

capital to capital. Their gateway to a country is the heart of a country itself.

I am well aware that travel in times past was actually easier than it is now from the standpoint of passports and visas. I am well aware of the "international sets" that frequented the world's top resorts and the foreign or colonial sets that made various rendezvous famous in Singapore, Shanghai, Calcutta, Paris, and so forth.

But it is quite different—or so I think—when people move with such speed that you can join a cosmopolitan group at the bar in the Excelsior Hotel in Rome and discuss casually the the quality of breakfast, the weather, the latest political gossip and other chatty news, about places a thousand miles away that had been left earlier that day.

There are a surprisingly large number of people in this world today who are familiar with what's going on in cities and countries separated by half the globe. "When I left Cairo this morning," or "In Hong Kong day before yesterday," or I'll call him as soon as I get into Rio tomorrow morning." Now this chatter is not by tourist or the occasional traveler. I'm talking about those whose business or occupation or employment makes travel necessary and who wouldn't or couldn't be doing all those things if the airplane were not available.

✣ ✣ ✣

Matter-of-Fact. Who are these people? The average American would be surprised at the number of governmental or international officials who flit about a great deal. Then there is the business man or salesman whose territory used to be a country or two and who now roams over a continent or two. There are magazine and news writers whose territories have expanded thousands of miles. There are aviation people of all kinds, including pilots, who are completely "at home" in places scattered over wide areas of the globe.

But what strikes me especially about this new group of airfleas—and I suppose I'm one of them—is the matter-of-fact way in which events and incidents are discussed about places that are thousands of miles away, but only hours or a day by air, all of which tends to make a mockery of all of the travel habits, the national boundaries and the transportation difficulties, of earlier days.

I have experienced some of this myself. On a recent trip to Europe I walked into a bar and was greeted by friends I hadn't seen for awhile. One had just arrived from San Francisco. Another had just arrived from Cairo. It is rare these days when I don't run into people I know. And for myself, I feel as much at home at the Bolivar or Crillon in Lima as I do at the Grand Hotel in Stockholm or the Hollywood Roosevelt in Los Angeles.

Maybe I'm kidding myself that this new group of airfleas has any real significance in bringing the world closer together. But I have a feeling that through the decades to come, it will have a real bearing. Maybe we'll have to go through another world war first, but when a sufficient number of human beings regard a continent in the same time-distance familiarity as they used to regard a country—through legitimate economic occupational activities—then

In Lima, Hong Kong, Cairo . . .

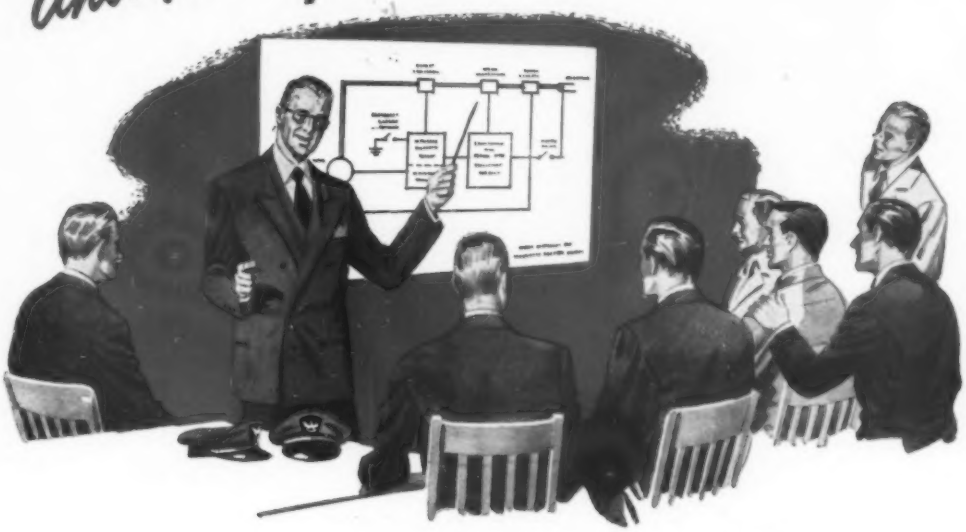
I think the airplane is on the way to becoming a truly vital factor in world stability.

I admit that a long time may elapse, but history is made in terms of centuries and the airplane has already started the ball rolling toward a new era. Jet power will further step up the trend in the next few decades. It may well be that the airplane will be a greater means to an end than skeptics like myself have thought. It's a hope anyway.

✣ ✣ ✣

Odd Bits. The two quietest cities in the world are **Lisbon,** Portugal, and **Caracas,** Venezuela. No horn blowing. Car lights serve as warning signals at night; people drive with dims and put on lights when approaching intersections. In **Caracas** the Latin drivers have a hard time keeping from honking the horn so they bang the side of their cars when traffic won't move . . . In **Lima,** Peru, red geraniums (which grow all-year round down there) are used instead of red flags and lanterns to mark street repairs. Looks fine during the daytime but the unwary driver at night usually wrecks his car . . . **Herman Theilig** of American Airlines has a new take-off on the John Gunther books whose titles start with "Inside —." Theilig ate so much on a recent European tour with his wife he says he's writing a new book called "Europe Inside Us."

And Now Gentlemen—



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